C SR

EASTERN MICHIGAN UNIVERSITY
LIBRARY
NOV 1 J 1973
SOCIAL SCIENCES

VOL. XI • NO. 4 • OCTOBER 1973

# DEVELOPMENT DIGEST

LIBRARY
EASTERN MICHIGAN UNIVERSITY
YPSILANTI
U. S. DEPOSITORY DOCUMENT

NOV 1 4 1973

The DEVELOPMENT DIGEST is prepared for the Agency for International Development by the National Planning Association, a private, non-profit organization in Washington, D. C.

We would appreciate comments of an editorial nature and suggestions of material for possible inclusion in the DIGEST. Please address:

Editor: DEVELOPMENT DIGEST
National Planning Association
1525 - 18th Street, N. W.
Washington, D. C. 20036

The material included in the DIGEST adheres faithfully to the sense of the original. It does not, however, indicate omissions, minor editorial changes, etc. For scholarly purposes, the original source should be consulted.

Inclusion of material in the DEVELOPMENT DIGEST does not imply that the opinions and conclusions expressed herein are those of the United States Government or of the National Planing Association.

Except where otherwise noted, the material in the DIGEST may be freely reproduced in Latin America, Africa, and Asia (except Japan), either in English or in translation, or may be adapted, provided credit is given to the author and original source, and further provided that the sense of the original is not distorted. Where material carries a copyright notice, this notice must also be included in the credit citation.

Use of funds for printing this publication approved by the Director of the Bureau of the Budget June 2, 1966.

---

For information on how to obtain the DIGEST, see inside back cover.

S

S18.33:
H/4

# DEVELOPMENT DIGEST

A quarterly journal of excerpts, summaries, and reprints of current materials on economic and social development

Gordon Donald, Editor; Julia Graham Lear, Associate Editor;
Martha Petkas, Editorial Assistant

Prepared by the NATIONAL PLANNING ASSOCIATION

for

Agency for International Development, U. S. Department of State

LIBRARY
EASTERN MICHIGAN UNIVERSITY
YPSILANTI
U. S. DEPOSITORY DOCUMENT

CONTENTS

Volume XI, Number 4 October, 1973

TAXATION

TAX STRUCTURE IN DEVELOPING COUNTRIES
Charles Mansfield 3

TAXATION FOR ECONOMIC DEVELOPMENT
V. V. Bhatt 11

CURTAILING TAX EVASION
Colombian Commission on Tax Reform; Richard A. Musgrave, President 19

IMPROVING AGRICULTURAL TAXATION IN INDIA
S. S. Johl 27

TAXATION TRENDS
Jacob Meerman 34

RURAL WORKS

THE PUBLIC WORKS APPROACH TO LOW-END POVERTY PROBLEMS
John P. Lewis 41

RURAL PUBLIC WORKS IN MOROCCO
Dudley Jackson and H. A. Turner 55

RURAL WORKS IN INDIAN DEVELOPMENT
V. S. Vyas 62

A LAND ARMY PROJECT IN KARNATAKA, INDIA
W. Graeme Donovan 67

TRANSFER OF TECHNOLOGY

NEW TRENDS IN TECHNOLOGICAL TRANSFER
Charles S. Dennison, Harrison Brown and Simon Teitel — 83

NEW MEXICAN LEGISLATION ON TECHNOLOGICAL TRANSFERS
Miguel S. Wionczek — 92

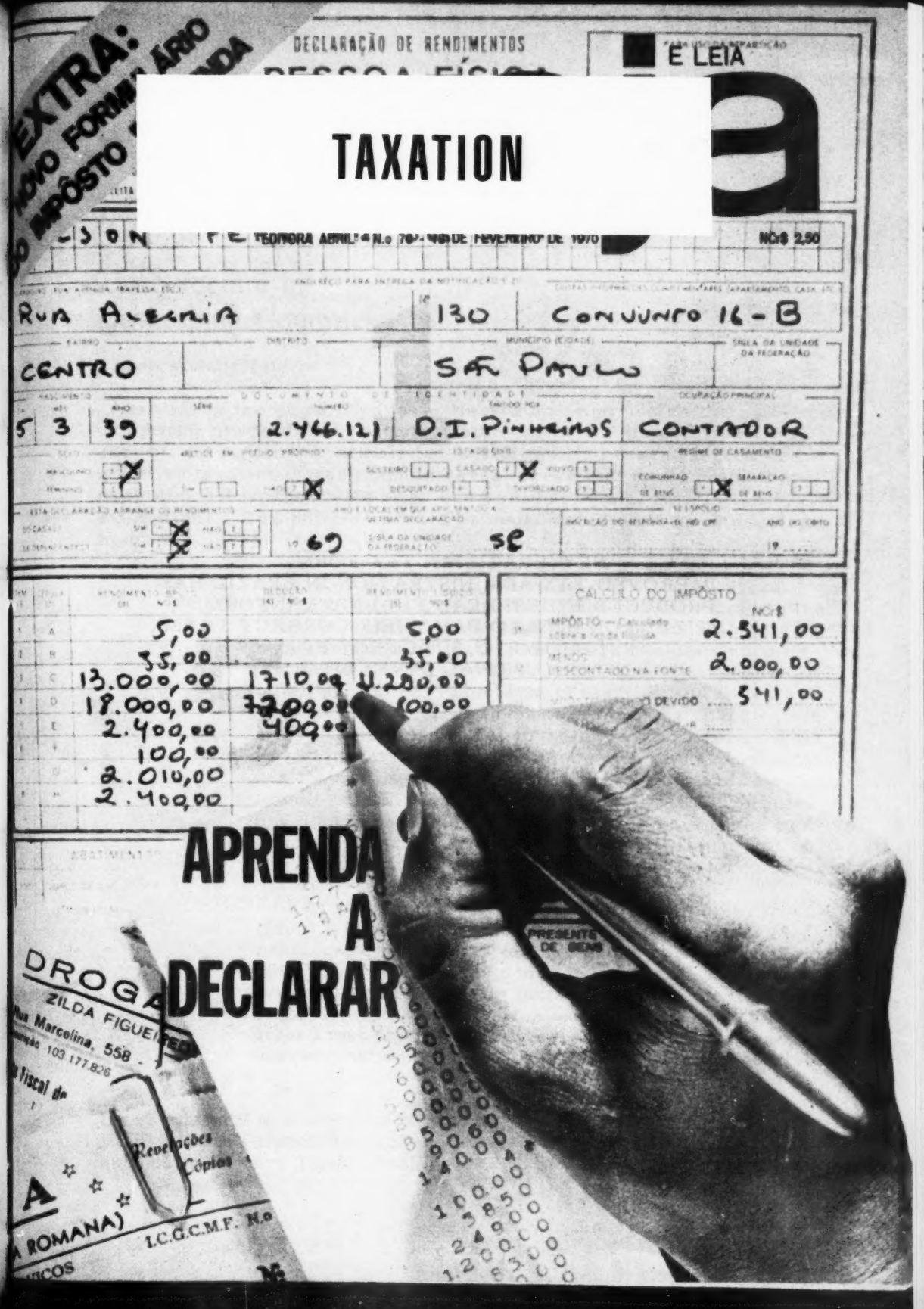
TECHNOLOGICAL CHOICE IN CHINA
Shigeru Ishikawa — 98

INTERNATIONAL TRANSFER OF TECHNOLOGY TO INDIA
V. N. Balasubramanyam — 109

INDEX-VOLUME XI, 1973 — 125

(Unless otherwise indicated, currency is expressed in U. S. dollars.)

# TAXATION


EXTRA:
DECLARAÇÃO DE RENDIMENTOS
E LEIA
RUA ALEGRIA
130
CONJUNTO 16-B
CENTRO
SÃO PAULO
2.466.121
D.I. PINHEIROS
CONTADOR
CASADO
COMUNHÃO DE BENS
SEPARAÇÃO DE BENS
CÁLCULO DO IMPÔSTO
IMPÔSTO — Calculado
MENOS DESCONTADO NA FONTE
2.541,00
2.000,00
541,00
APRENDA A DECLARAR
DROGA
ZILDA FIGUEIREDO
Rua Marcelina, 558
Fiscal de
Revelações
Cópias
A ROMANA)
I.C.G.C.M.F. N.o

NEW BRAZILIAN TAX FORM.
IMPROVED TAX ADMINISTRATION IN BRAZIL HAS PRODUCED WIDESPREAD PUBLICITY INFORMING CITIZENS ON HOW TO PAY THEIR CORRECT TAXES.
[ PHOTO: U. S. AGENCY FOR INTERNATIONAL DEVELOPMENT]

# Tax Structure in Developing Countries

Charles Mansfield

[Analysis of the kinds of taxes collected by countries as their development proceeds suggests the following policy implications. A survey of a nation's available tax bases and its present degree of effective taxation of each should reveal areas that could be further exploited. Revenues have often been eroded by a growth in tax exemptions. Tax policies should be coordinated with other development policies.]

All countries, from the highly industrialized to the least developed, are concerned about the amount of taxes they can collect. Less work has been done on how taxes are or should be composed—the question of tax structure. The level of taxation and its rate of growth, however, can be altered only by changing the individual elements that make up tax structure. This is a complex matter; each element of the tax system has its own rate of growth, its own base, and is related to distinct economic variables. Although in developing countries less attention is paid to the incidence of taxation, this too is ultimately dependent on the composition of the country's taxes.

Tax structure questions take on a particular urgency for those countries for which government expenditure is rising faster than gross national product (GNP) or tax revenues under existing rates. Since economic policy usually dictates a rise in tax revenue (provided that expenditures cannot be cut) these countries must choose intelligently in altering the composition of taxes. A good deal of thought has been given

Dr. Mansfield is a member of the Fiscal Affairs Department of the International Monetary Fund, Washington, D. C.

recently to tax structure and tax bases, and I propose to outline some of the results of this work.

## Tax Structure and Tax Bases

The base of a given tax is the source from which its revenue derives. The base may be an economic flow such as personal income for the personal income tax, or imports for import duties. The base may be property, such as agricultural land or urban buildings, on which a tax is levied. Finally, the base may be simply a unit of population or other unit of account, such as the number of people for a poll tax or the number of huts for a tax on huts. Obviously a close relationship exists between the tax bases available in an economy and the tax structure actually found; in a sense the tax bases available set limits on possible tax structures. We should be surprised, for example, to find the United States, with a relatively small foreign trade sector and a correspondingly small import base, relying heavily on import duties. It would also be surprising if in a commercial city-state, such as Singapore, the urban property tax were not a significant element in the tax structure. Apart from setting limits on tax structure, however, the relationship between tax bases available and tax structure actually found is a very complex one, depending on political conditions, cultural traditions, administrative convenience, and all the other factors (including chance) that determine just which potential bases are chosen to be taxed.

One hypothesis concerning the relationship between tax structure and tax bases is that the two are very closely connected in the early stages of development in the sense that tax structure would easily be predicted given a knowledge of the available bases (i. e. those administratively feasible to tax). As the economy advances, however, a plethora of bases emerges. The tax structure for advanced economies would then be more a reflection of political and cultural styles than a simple translation of tax bases to tax structure. This difference in emphasis in explaining the reasons for a particular tax structure is characterized by the favoring of either the "tax handle" theme— the close linking of tax structure to available tax bases —or the favoring of one or more of the other determinants of tax structure.

## Historical Experience

As noted above, one way of approaching the question of tax structure and development is to explore the way in which tax structure has changed historically as economies have evolved. Harley Hinrichs, in his General Theory of Tax Structure Change During Economic Development (Cambridge, Mass.: Harvard Law School, 1966), has sketched out a pattern of tax structure change from traditional to industrialized societies. This pattern is as follows: First Stage: Traditional societies rely primarily on non-tax sources (such as fees

or levies from state monopolies) and/or "traditional direct" taxes—taxes on land, livestock, heads, agricultural output, water rights, and so forth. Second Stage: When the society begins to break away from old ways, indirect taxation becomes more important, especially taxes on foreign trade. The extent of reliance on such indirect external taxes depends on the openness of the economy. Third Stage: Meanwhile, traditional direct taxes are likely to decline relative to national income and government revenue. Fourth Stage: As domestic production (based on internal trade and monetization) continues to develop, internal taxes (e. g., excises and sales taxes) grow rapidly and tend to replace import duties. This stage is illustrated by the process of import substitution and the introduction of sales taxes in many developing countries in the last ten years. Fifth Stage: When the economy reaches maturity, modern direct taxes (e. g., personal income and corporate profit taxes) become predominant, as in the United States and the United Kingdom today.

The transitional stage—beyond traditional economies but below advanced—is the category that fits most of today's developing economies. In terms of rates of growth in this transitional stage, Hinrichs generalizes that taxes on foreign trade grow most rapidly at first; then taxes on consumption and transactions; while finally, although only at the end of the transitional phase, modern direct taxes increase faster than internal indirect taxes. Another interesting question treated by Hinrichs is to what extent economies at equal levels of development would have different tax structures. Hinrichs found tax structure flexibility to be a luxury of advanced economies, which have a wealth of tax bases from which to choose and can adopt a tax structure fitting their cultural and political styles.

Another approach to tax structure change, less ambitious in scope, has been offered by Richard Musgrave as a part of his book Fiscal Systems (New Haven, Conn.: Yale University Press, 1969). For the traditional economies Musgrave gives special emphasis to the tax handle theme, i. e. the argument that the basic determinant of tax structure at this stage of development is the availability of feasible tax bases. According to Musgrave's formulation, in the early period of an economy's development agriculture is typically predominant in the economy. Given this importance and the difficulty of taxing agriculture through an income tax, land taxes become an important element in tax structure in this period. Selected excises and the use of public enterprises (monopolies) as a revenue source are also important in this early period. Whatever income tax is collected is effectively limited to the wage incomes of civil servants and employees of large firms. The determination of business income is difficult, and effective corporate taxation is limited to a few large

firms, often foreign owned. The most effective tax handle for economies in this stage with a high foreign trade component is exports and imports. Both exports and imports are typically concentrated in a few ports, are relatively easy to value, and may encourage less massive taxpayer resistance since imported goods are usually not strict necessities in private consumption and exports are often concentrated in the hands of a few firms.

In the later period of an economy's development, tax authorities are offered a much greater variety of tax handles or available bases to tax. On the other hand, as Musgrave points out, the forms in which income is received or outlays are made is extraordinarily complex in a modern economy. Thus, problems of revenue collection tend to shift from the search for feasible tax bases to the devising of forms of taxation yielding effective collection from the wide variety of tax bases available. At the same time, problems of enforcement shift from extension of the tax net to plugging loopholes that constitute legal means of avoiding tax payment.

Non-economic factors also cause changes in tax structure. The rise of egalitarian philosophy in the late nineteenth and early twentieth centuries, which led governments that favored it to attach increasing importance to the progressive income tax, is an important example. Another non-economic factor favoring the increasing importance of the income tax in developed countries has been increasing centralization of government. For a variety of reasons, including principally the difficulty of identifying the geographic source of income, the income tax is suited to be a national, rather than a state or local, tax.

Ironically enough, as the income tax has evolved into a mass tax by continued extensions of its coverage, the tax has changed from a levy on the rich to a broadly based source of revenue. At the same time, the possibility of achieving tax progressivity through indirect taxes on luxury consumption is now receiving more attention. The contrast between regressive indirect taxes and progressive direct taxes has thus diminished sharply.

Another empirical approach to the subject of tax structure in developing countries is that of Jørgen Lotz and Elliott Morss in an International Monetary Fund study, "The Structure of Developing Countries, An Empirical Study." In addition to more extensive work explaining differences in tax levels, they explored the relationship between a number of dimensions of development and different types of taxes. Lotz and Morss focused on the relationship between separate taxes and three major variables: two relating to the stage of development of the economy (per capita income and an index of monetization) and the third relating to the degree of openness (ratio

of exports to GNP). Among a number of findings, two particularly significant conclusions emerged: First, revenue collected from the corporate income tax depends on the openness of the economy and is particularly related to the importance of oil and mineral industries as a proportion of total exports. These industries offer a concentrated source for taxation, are politically easier to tax because such taxes are usually paid by foreigners, and are frequently very profitable. Second, sales taxes, stamp duties, and social security taxes are closely related to the degree of monetization of an economy, as distinct from its level of per capita income. These taxes are not self-assessed and so do not require literacy. They have been found to be important new taxes in developing countries.

Summing up the results of empirical investigations of tax structure change in the process of development, we may say that tax structure at a given time and place depends on: (1) the set of available tax bases, with availability defined in terms of administrative feasibility; (2) the level of development reached, as indicated by such factors as the degree of monetization and per capita income; and (3) all the range of factors that we might label social and political, including the cultural style of the taxing government, the degree of urbanization, and prevailing political interest groups and philosophies.

An interesting question in this regard is whether present developing countries need necessarily follow the historical path of currently developed countries in evolving their tax structures. Current ideas of equity and, perhaps, the development of the technology of revenue collection may have an influence on tax structure in present-day, low-income countries. On the other hand, it may be that the changing availability of tax bases (our tax handle theme) will turn out to be the more fundamental factor. If the latter is true, the process of tax structure change for developing countries may be broadly similar to the historical path of developed countries.

## Some Policy Lessons

Countries differ widely in levels of tax to GNP, even taking into account differences in per capita income. Thus, for those countries with relatively low tax ratios finding it necessary to finance higher levels of government expenditure, there is very probably scope for increasing tax collections by identification and effective exploitation of available tax bases. One approach is the construction of an inventory of available tax bases and a measure of their effective exploitation as calculated by the percentage of tax receipts collected to the base. Such bases would include production bases, such as agricultural output sold at the market, and manufacturing conducted in establishments above a minimum scale; income bases, including

wage or salary income derived from employment in establishments above a certain scale; consumption bases, including retail, wholesale, and manufacturing sales by establishments above a certain size; trade bases, including imports and exports; and asset bases, including assessable property holdings such as land or real estate. In constructing such an inventory it may become clear that some available bases, such as imports and exports, have been rather fully exploited (as measured by the ratio of tax collection to base) whereas other bases—such as the property tax—have been relatively neglected, as measured by this ratio. Such an approach may uncover unexploited or underexploited sources of revenue, and at least lead tax policymakers to examine whether underexploitation is due in all cases to the catchall of "administrative difficulties" or whether it might be due also to oversight or more deliberate neglect.

Underexploited tax bases may exist for the very good reason that administrative difficulties make these bases difficult to tax. However, it may be that new methods of taxation may make the exploitation of existing bases more feasible administratively. In part, this may come through the development of simpler methods of assessment and/or payment. For example, an argument against the use of the company income tax in developing countries has been that it requires complicated bookkeeping. This difficulty may, however, be overcome through the use of rules of presumptive profits, such as a given percentage of gross sales. Personal income taxation may also be carried out by the use of withholding schemes, thus lessening the need for literacy. Another tax that has not been widely used because of administrative difficulties is the property tax. Enforcement of this tax has depended on proper assessment of rental or capital values. Suggestions have been made, however, that proxies such as physical features or locality could take the place of more conventional assessments of market value. Thus one direction suggested by an analysis of tax bases and tax structure is the development of simplified methods of assessment and collection for taxes that have not been legislated or collected because of problems of administration.

Another policy lesson to be learned from an examination of tax structure and development is the need to avoid erosion of available tax bases through too liberal tax exemptions. For example, a familiar pattern in developing countries is the establishment of import substitution industries, aided by duty exemptions on imported inputs and often, in addition, incentives in the form of partial or complete income tax exemption. If the country in question depends heavily on import duties, this import substitution may indeed be costly in terms of revenue loss, particularly as it tends to take place in consumer goods industries which are among those most heavily taxed. The benefits accruing from such a policy may,

incidentally, be small inasmuch as the assembly industry encouraged by the tax exemption often provides little in the way of value added or employment. This point illustrates the importance of coordinating trade, industrialization, and revenue policies, matters that are often left in separate compartments, and too often decided on the basis of an overriding desire to industrialize. The loss of revenue through import duty exemptions is often part of a larger phenomenon of a shift in taxation from imports to a country's growing domestic sector. This transition in indirect taxation from import duties to domestic excises and sales taxes may be crucial for a government depending largely on indirect taxation for revenue. A lag at this stage, when the import base is being eroded and the domestic base not yet effectively exploited is, in fact, an underlying reason for fiscal difficulties in some developing countries.

Model Tax Systems

So far we have spoken of empirical investigations of tax structure directed largely to the question of how tax structure changes with the process of economic development. A more difficult question, and one on which very little work has been done, is the normative question of what is a proper or model tax structure. Perhaps the major lesson to be learned from the empirical studies is that no one system of taxes is suitable for all times and places. The tax handle approach teaches us that as the economic structure (i. e., available tax bases) changes, so does the tax structure. Thus a model tax structure would always have to be a compromise between ideal characteristics of a tax system and available tax bases.

As a capsule formulation of a model tax system, we might say that a government must first decide on the "division of labor" between the public and private sectors, and thus the desired over-all level of taxation. Given this over-all level, a desirable mix of taxes should balance the following major criteria, which are not necessarily compatible, and indeed may often be conflicting:

Equity. One of the classical canons of public finance, tax equity, is usually thought of in terms of the concepts of benefits received and ability to pay. The "benefits received" principle refers to taxes on particular segments of the population in return for particular benefits from public expenditure. The "ability to pay" principle refers to taxes financing more general expenditure and holds that tax incidence should be related to the relative economic position of the taxpayer. Two aspects of ability to pay are: "horizontal equity," holding that taxpayers with equal economic positions should have equal burdens; and "vertical equity," recognizing that a taxpayer's ability to pay is related to his economic level.

Efficiency. The goal of efficiency is to minimize the cost of collecting the tax in terms of administrative resources, and the cost of paying the tax in terms of taxpayer resources.

Consistency with economic objectives. The tax system should be consistent with over-all economic policy, which may include such objectives as favoring savings over consumption, raising private investment, and producing a favorable impact on the balance of payments.

Coordination and flexibility. The tax system should provide revenue sources to each level of government, allowing it flexibility and initiative in carrying out programs. At the same time an ideal tax system should link smoothly with other governments and with levels of government below and above it.

Elasticity. To the classical criteria of a tax system enumerated above should be added a feature of particular importance to developing countries: that of elasticity, or automatic increase in revenue in response to growth in income.

The model tax system will be a changing one, not only because of changes in the available tax bases but also because of changes in the goals of tax policy. It is easy to see how the set of available tax bases would change in the process of development, but changes in desired goals—such as revenue growth versus equity—may just as easily change the desired tax structure that is chosen from the available bases.

[ Excerpted from "Tax Structure in Developing Countries: An Introduction," Finance and Development. Washington, D. C.: International Monetary Fund and the International Bank for Reconstruction and Development, Vol. 8, No. 1, March 1971, pp. 37-41. ]

# Taxation for Economic Development

V. V. Bhatt

[ The personal income tax, corporate tax and indirect taxes collected from manufacturers constitute the three major taxes in their impact on development and their contribution to state revenue. As such, their structure and rates must be made consistent with the major policy objectives of the government. With the reforms in these three taxes suggested here, there will be an increase in the real resources of the economy and government revenue is likely to increase. ]

This paper deals with three major fields of taxation: (a) personal income tax, (b) corporation tax, and (c) indirect taxes collected from the domestic manufacturers of products. These three taxes are important for developing countries because of their impact on economic development as well as their contribution to government revenues. But before discussing each of these taxes, I would like to make two observations; the first relates to the nature and stability of the tax structure, and the second to the need for adequate open and effective discussion of tax proposals.

For major government policies, including tax policy, what is essential is to frame them to induce rapid growth with social justice, and at the same time to ensure that they are simple, easily intelligible, and are not likely to change in an ad hoc

Dr. Bhatt is with the Economic Development Institute at the World Bank, Washington, D. C.

unprincipled manner. The tax system is an organic part of the economic system, and hence it is essential that there be some certainty and stability about its basic features. A large number of ad hoc changes each year creates a climate of uncertainty, which hampers productive effort and diverts valuable scarce resources towards speculative and other undesirable channels, as well as encouraging efforts to circumvent the government measures.

If some stability and a greater certainty with regard to the impact of the tax system on the economy are to be ensured, it is essential that tax proposals be formulated in the light of adequate research based on actual experience with regard to the working of the tax system in the country as well as abroad. In some countries (as in India), it is the Inland Revenue Board under the Ministry of Finance which is responsible for the implementation of tax laws, as well as for formulating tax proposals in consultation with some type of Economic Division (called by various names in different countries) in the Ministry of Finance. However, very few countries have a tax research unit in the Board with the result that tax proposals are not formulated rationally.

I think that it would be useful to set up a research cell in the Inland Revenue Board which could be assigned the function of formulating both short-run and long-run tax proposals for public discussion as well as discussion in Parliament. This Board has actual field experience with regard to the tax system, and it would be wise to use this experience with regard to the tax system, and it would be wise to use this experience for formulating proposals for tax reform. There should be a creative dialogue between the research cell at the Board, and the Board's field staff. The actual proposals for reform of existing taxes or new tax proposals should emanate from the research cell as a result of such a dialogue, which is essential for sound viable and efficient evolution of the tax system.

These proposals need to be published so as to stimulate wide constructive public discussion. From among such proposals, the government should select those it thinks are worth implementing in a given year. But then, when such proposals are discussed in Parliament, it should be ensured that this discussion is both enlightened and constructive. In countries with a parliamentary form of government, there is need for a Parliamentary Select Committee to study and report on the tax proposals to Parliament. Even this may not serve much useful purpose unless this Select Committee has the right to invite people from the Ministry of Finance, particularly those who may have some share in devising the proposals and those who are likely to have some informed, enlightened views relating to them, as well as those from the public—economists, tax experts as well as laymen—who would be in a position to contribute constructively to the evaluation of tax proposals from the point

of view of their impact on major socio-economic goals. The government would then be in a position to choose the final proposals in the light of informed and constructive debate in Parliament. Let me now pass on to the discussion of the three specific taxes mentioned earlier.

Personal Income Tax

The personal income tax, I feel, should serve two objectives: (a) to promote the incentive to work and save; and (b) to make the distribution of consumption more equal. Progressive and steeply rising tax rates on personal incomes do hamper the incentives to work and save. They are ineffective in their result as they direct personal effort towards activities which can enable the individuals to evade the tax burden. Hence, I suggest that financial savings be exempted from taxation, while capital gains are treated like other current income, specifically, the tax base for the personal income tax should not be total income but toal income (whether from work or investments) plus capital gains minus net change in financial assets; the assets to be included should be all financial assets excluding currency holdings in gold. These financial assets comprise bank deposits, small saving instruments, insurance policies, provident funds, and claims on the private sector and the government (stocks and bonds).

This would be in effect a tax on consumption. With such a tax, the tax rates can be sharply progressive and still the incentive to work and save would not be adversely affected. The demand for social justice would be met as the degree of inequality in consumption can be reduced by means of such a tax. Private fortunes, of course, could be built up but their effect can be offset by a properly coordinated pattern of other direct taxes like the wealth tax, inheritance tax and gift tax. These taxes should be such that no private fortune, however large, can really support a household for more than three generations. A comprehensive return should be asked for with regard to all these taxes from individuals.

This reform is administratively quite simple. Even at present, exemptions are given in various countries with regard to some financial assets like provident fund contributions, insurance premiums and others. Further, in some countries, interest and dividend incomes are also exempt from tax to some extent. Instead of this multiplicity and complexity of diverse exemptions, what is suggested is that all savings in financial assets excluding currency and gold be exempted from personal income tax. With this reform, no interest or dividend incomes should be tax-free. All incomes to the extent to which they are not saved in the form of financial assets (excluding gold and currency) would be taxed.

This reform need not result in any revenue loss for the government. The present tax rates can be revised upwards once the tax base excludes financial saving so as to result in the same revenue as is obtained at present. If, as a result of this tax reform, financial saving increases at a rate much sharper than it would otherwise have increased, it would more than offset any potential revenue loss. Such, indeed, would be the effect of this measure.

The proposed income tax reform has several distinct advantages: (a) It would raise the rate of overall saving as a result of the tax exemption for financial saving. (b) It would raise the proportion of financial saving to total saving and thus bring a larger part of total saving within the purview of policy instruments for resource allocation. It may be noted that policy instruments are available to affect the allocation of only financial saving, while physical saving (in the form of houses, other physical assets, etc.) are by and large outside the purview of direct policy instruments. (c) To the extent to which financial saving did not increase, there would be additional tax receipts. (d) Tax receipts could also increase as the proposed tax exemption for financial saving might induce tax evaders to show their correct incomes. Since financial saving would not be taxed, the most important present motive for concealment of incomes could disappear.

Corporation Tax

The tax base for the corporation tax in all countries has been profits after providing for depreciation at specified rates. On the false analogy of the progressive income tax on personal incomes, some degree of progression is introduced in some countries in the corporation tax structure. This progression in the corporation tax is actually a tax on efficiency, and the tax system thus tends to encourage inefficiency in the use of capital resources. Hence, the tax rate on corporate profits should be made uniform and applicable to all companies.

At the same time, the tax base needs to be made uniform for all companies. At present in some countries, there are various types of allowances (other than depreciation) which are tax-exempt. Further, there is a tax holiday for new companies on a certain rate of profit for five years. It is difficult to understand this multiplication of incentives. Apart from that, these incentives would have some meaning if they were selectively applied for the promotion of those industries which would not be otherwise started, but these incentives are applied to a large number of industries without much discrimination. I suggest that such incentives should not be allowed to a large number of companies; they should be very selectively applied to only a few industries which require promotion in the

national interest, and that only for a stated period of time. Every five years the industries to be given these incentives should be changed in the context of national priorities.

In a large number of countries, the tax base excludes interest payments on borrowed funds. I suggest that this be included as a part of profits in the tax base, and the tax rates appropriately lowered so as not to put any additional tax burden on this sector. When interest payments are tax-exempt, there is a tendency on the part of the corporate sector to rely on borrowed funds to a much greater degree than they otherwise would do. Even parent companies are induced to give loans to subsidiaries rather than make additional subscriptions to the paid-up capital of the latter. If interest payments on borrowed funds are included in the tax base, the tax system would really become neutral as between sources of funds: there would be to that extent an additional incentive to rely on paid-up capital by issuing additional shares, and borrowed funds would be utilized much more efficiently than at present.

The corporation tax should be used as an instrument to (a) promote productive efficiency, and (b) stimulate both exports and import substitution. To promote efficiency, I suggest that each percentage point increase in the rate of profit above 20 percent should mean one percentage point decline in the tax rate. The rate of profit should be calculated as the ratio (percent) of profit (after depreciation, including interest payments) to total capital employed, comprising paid-up capital plus all reserves plus all borrowings. A profit rate of 20 percent is essential, on certain assumptions, if a growth rate of 8-10 percent in industrial output is to be secured; that is the logic for inducing all firms to realize this rate of profit.

To promote exports and import substitution, I suggest that each percentage point of annual increase in the net export ratio should mean one percentage point decline in the tax rate. The net export ratio should be defined as the ratio of the current value of exports minus the current value of imports of materials, spare parts and components to the value of imported plant and equipment. Such a link would promote both exports and import substitution and, at the same time, induce efficiency in the use of imported plant and equipment. [Note: This ratio would need reformulation when exporting firms had no imported equipment.]

These two tax incentives would not only tend to promote productive efficiency of overall investment, and of investment in imported plant and equipment, but would also indicate to the firms rational criteria for project selection. Any decline in tax receipts on these counts would be more than offset by their favorable impact on productive efficiency and on exports and import substitution.

With these tax incentives, a large number of complicated measures of uncertain value should be abolished.

Some Commodity Taxes

In developing countries, commodity taxation is of particular significance from the government revenue point of view. Commodity taxes quite often take the form of excise duties on certain specified commodities: these taxes are collected from the domestic firms producing these products at a specified rate per physical unit of output. This form of taxation would be appropriate in the case of commodities which are standardized and are consumed by large numbers of persons.

However, the other commodities which are subject to such taxes in various countries tend to raise more complex issues, and they often form only a part of the products which the concerned firms manufacture. In these cases, the collection costs are considerable; at each factory, there has to be an excise inspector at the gate to watch and supervise the exit of the specific commodities and to be vigilant enough to check whether the taxed commodity is not leaving the factory gate under the name of another non-taxed or low-taxed commodity. Even with these large collection costs, the possibility of evasion is not ruled out. With all these costs the revenue is by no means substantial and probably, net of collection costs, would be negligible.

I suggest, therefore, that excepting the few standardized commodities and commodities of mass consumption, there should be no such taxes on the other commodities. Instead, there should be a uniform ad valorem tax of the turnover type on all mining and manufacturing establishments on the value of their output. Even at present, some ad valorem duties exist in some countries and this principle needs to be generalized for all output other than of the few commodities mentioned. The collection costs would be much smaller as the tax would be on an assessment basis. Much more important would be the link established between tax receipts and industrial output and prices; the former would grow at the growth rate of the latter automatically without the need for tinkering with excise duties in each budget, as is being done at present (in India).

The next question is: What should be the tax base and what should be the tax rate for this generalized tax? I suggest that the tax base be taken as value of output, largely on the ground that it is administratively easier and quicker to collect these data from the existing published sources, and no recourse to fresh collection is necessary. This suggested tax base would lead to the so-called "cascade effect." That is, since a material-producing firm will have paid a tax on its

products, the material-using firm consuming these commodities would then pay a tax on a base which is enlarged as a result of the tax already collected. The tax-effect thus would discriminate against final goods manufacturing firms, and favor integrated firms. From this point of view, a value-added tax would be better than a turnover tax. However, a value-added tax is quite complicated, and in countries where proper accounts are not kept by industry and trade it may be difficult to enforce. On the other hand, an excise tax of the type I have suggested is administratively much simpler to enforce as it would be imposed only at the stage of manufacturing, and at this stage adequate output data are likely to be available.

The so-called "cascade effect" could be minimized by keeping a lower tax rate. Further, the additional "cascade effect" is unlikely to be large in India as even on the present basis some intermediate goods like cement, iron and steel products, aluminum, paper, tires and tubes, copper and copper alloys and synthetic and organic stuffs are taxed and some at a fairly high rate. If these duties are abolished and replaced by the new generalized tax, it may turn out that the additional "cascade effect" would be negligible. Since prices have already been adjusted to the present duties, there need not result any additional adjustment in prices. It is glibly assumed that the generalized tax would be passed on to the consumers. If it is not passed on or passed on only partially, the "cascade effect" may be very small. Even if there is some "cascade effect" it would induce economy in the use of materials and capital and this would be worth encouraging.

For export promotion, it would be easier to give remission on tax paid on part of the output exported. A firm exporting, say, 25 percent of its value of output would not pay tax on this 25 percent. This tax incentive would be easier and quicker to administer than the draw-back provisions existing in some countries at present. If the "cascade effect" is significant (which is unlikely), it may affect adversely exports of products in whose costs raw materials consumption costs are significant. However, this would be offset by the tax incentive with regard to the corporation tax suggested earlier. For all these reasons, I propose value of output as the tax base for the proposed generalized excise tax.

What, then, should be the tax rate? For this purpose it would be necessary to work out the existing proportion of excise duties to the value of mining and manufacturing output (excluding the few commodities mentioned earlier). To keep the revenue at its present level, all that would be necessary is to have a generalized turnover tax equal to this proportion (percent) of the value of mining and manufacturing output. This rate may then be raised marginally for additional revenue purposes.

For export promotion, this tax should be levied only on value of output minus the export value. This tax device would be much simpler than the complicated time-consuming drawback provisions existing at present. From the point of view of administrative convenience and cost as well as the prompt benefit to exporters, the suggested device would be simpler, prompter and more effective than the present provisions.

Concluding observations. With the suggested tax reforms, government revenue is likely to increase. What is important, however, is that even if the tax revenue did not increase, there would be an increase in the real resources in the economy and a reduction in consumption disparities. For example, if additional tax receipts under the income tax did not materialize, there would be an equivalent additional increase in financial saving and reduction in consumption disparities. From the point of view of the economy, additional resources would become available.

To the extent to which the additional tax receipts turned out to be lower than anticipated for the corporation tax and generalized turnover tax, there would be a more-than-offsetting rise in exports, import substitution and productive efficiency. In fact, if the tax receipts proved lower than anticipated, it would mean a substantial increase in domestic and foreign exchange resources, and as a result a higher-than-anticipated growth rate in national income, investment, exports, and import substitution. Such increases in the tax base would in any case eventually augment revenues from existing tax rates.

Thus, the proposed changes in the tax system would induce either additional tax receipts or additional real resources; in either case, the economy would stand to gain.

[Excerpted from "Taxation and Economic Development," Economic and Political Weekly. Bombay: Sameeksha Trust, Vol. VII, No. 26, June 24, 1972, pp. 1237-1241.]

# Curtailing Tax Evasion

Colombian Commission on Tax Reform;
Richard A. Musgrave, President

[The evasion of tax payments is a serious problem in many countries; collection of income taxes from self-employed persons in the cities, and from those in the agricultural sector who could and should pay more, is often difficult. The following proposals for dealing with this matter were extracted from a comprehensive report by a commission on tax reform in Colombia.]

The existence of substantial income tax evasion and avoidance is widely recognized. They are prevalent especially among the self-employed in commerce or in the professions, and particularly in agriculture where the income tax is largely ineffective. The Commission believes that reduction of evasion is an urgent, perhaps the most urgent, objective of tax reform. In a situation where national priorities require increased revenue, it is imperative that this revenue be provided first of all by those who do not meet their obligations under present law. Unless offending groups pay their fair share, additional burdens must be placed on those taxpayers who now honestly meet their obligations, and the inequity in the sharing of tax burdens will be increased. For these reasons, the Commission urges prompt implementation of whatever legislative and administrative changes may be needed to remedy this situation.

## Commerce and the Professions

Research into tax evasion in this area involved examination of a sample of 2,000 cases in 28

Dr. Musgrave is Professor of
Economics, Harvard University
Cambridge, Massachusetts.

different activities. Failure to report ranged from 20 percent to 50 percent among stores, small manufacturing establishments, service establishments and restaurants. Among professionals filing returns, underreporting ranged from 10 percent to 70 percent. These results are not surprising, for they merely support the general impressions reported by those familiar with prevailing practice. To improve the situation, new and imaginative procedures must be applied. The Commission recommends the following improvements.

Compulsory filing requirement. The filing requirement should be made obligatory (independent of income position) for all self-employed persons engaged in certain activities, including trade, restaurants, service establishments such as beauty parlors and barbershops, small manufacturing, and all licensed professions. Renewal of licenses to operate such establishments should be contingent on proof that a return has been filed. Failure to comply with the filing requirement should result in substantial penalties.

Selective application of intensive audit. Auditing should be placed on a more selective basis. Instead of limiting auditing to a formal, arithmetic checking of returns and accounts, as is now the practice, an intensive attempt should be made to determine actual income. Since such a determination cannot be made for all taxpayers, selection of the taxpayers or groups of taxpayers subject to the intensive audit is an important matter. The groups of taxpayers chosen might be those who engage in types of economic activity where underreporting has been especially severe, such as trade; and different groups might be chosen in different years. Or intensive audit could be applied to selected individuals for whom there may be cause to suspect underreporting. Such a selection might involve taxpayers living in expensive neighborhoods but not engaged in regular occupations, or taxpayers whose returns show unusual features such as a low ratio of taxable to net income, a low ratio of taxable income to net worth declared, or a low level of gross income relative to the size of the establishment, the number of employees, or the value of the premises occupied. To permit effective selection, systematic attention should be given to developing appropriate indices applicable to various trades and occupations on the basis of which returns could be chosen for intensive audit.

In carrying out an intensive audit, the tax authorities should make use of supplementary information that might help to determine the taxpayer's income. Liabilities under net wealth and property taxes should be cross-checked, as well as information from other government agencies and from private third parties, and use should be made of nontax information from private institutions such as banks and public utilities. Although the present law gives the administration wide authority to obtain such information from private and

public persons, little use has been made thereof. Administrative guidelines should be established for using and applying such information, including that from banks, public utilities, large suppliers and purchasers, and so forth.

Presumptive income determination. Beyond these efforts toward more intensive auditing and the use of supplementary information, the tax administration should be authorized to presume the actual level of income where the taxpayer fails to supply information adequate for a direct determination, and to assess a tax based on the presumed level. Such presumptions may be based on the criteria outlined in connection with more intensive auditing. In cases where a presumptive tax is applied, however, the taxpayer should have the right to rebut the presumption by providing proof of actual costs, gross income, exemptions, and deductions. Although effective income tax enforcement is not now possible without presumptive power, such power should not be used in an inequitable fashion.

Application of the measures proposed here will require administrative changes, training of special auditing personnel, and so forth. The Commission proposes that an elite auditing staff be created to handle the application of intensive auditing and that the necessary budgetary provision, including staff salaries at competitive levels, be made. Such an investment will unquestionably yield substantial returns in terms both of revenue and of a more equitable distribution of tax payments, not only because methods of dealing with tax returns will improve but also because publicity regarding the new procedures, combined with adequate penalties consistently enforced, will tend to raise the level of voluntary compliance. Such publicity must again emphasize that the purpose of these measures will be to protect the taxpayer who complies with the law, and that additional burdens will be imposed only if compliance is inadequate. As various measures are taken to secure stricter compliance, the taxpayer will need to be assured that his rights will be protected, that no unnecessary intrusion into his personal affairs will occur, and that complaints will be given proper attention. The tax authorities should provide full information on the rights and duties of taxpayers and should be cognizant of the need to secure cooperation and to create confidence in the tax administration. The potential revenue gain from the above set of administrative changes is not easy to estimate, but there is good reason to believe that the revenue cost of tax evasion and avoidance is substantial.

## Agriculture

Agriculture is the other major area in which improved application of the income tax is urgently needed. Estimates indicate that at present only four percent of the income tax, compared with 32

percent of national income at factor cost, originates in agriculture. Although the share of income tax contributed by agriculture is typically lower than the share of income originating in agriculture, the imbalance in Colombia appears to be unusually large. Admittedly, the average income is lower in agriculture than in other sectors and thus a larger fraction of agricultural income would be expected to fall below the taxable minimum. Yet since the distribution of income appears to be even more unequal in agriculture than in the economy as a whole, the fraction included in aggregate taxable income would be expected to be larger. All in all, it is evident that income tax proceeds from agriculture are very low and that the evasion rate may be as high as 90 percent. It should be noted that although the agricultural share in direct taxes would be higher if the land tax and exchange differentials were included, it would still be low relative to the agricultural share in national income. The Commission feels that the income tax should apply to income earned in agriculture as well as to income from other sources, and that certain steps need to be taken to ensure taxation. The urgency of the problem is evident from the fact that a significant part of agricultural income which is now free of tax accrues to taxpayers in the high-income brackets.

Farming. To secure effective taxation of income originating in farming, a presumptive income tax is needed for the more valuable farms. The usual procedure, under which the recipients of taxable income are expected to declare their gross receipts and costs, cannot be relied upon to produce satisfactory results. Nor would the mere use of presumptive evidence in checking returns be sufficient. Net income must be determined on a presumptive basis, and the taxpayer should be assessed on this net income. The presumptive income might be determined by a fairly sophisticated approach such as that of the forfait system in France, where the income from a given acreage is presumed to be the amount that it would earn if its return per acre were the same as that for the average farm in the region. In principle, such a system could be applied in Colombia, but administrative requirements might be excessive, and efficient application might be difficult. The Commission, therefore, recommends that a simpler system be used, one based on a moderate flat rate of return on assessed value. The revision of assessed values now in progress would make this approach feasible and relatively simple. To the extent that assessed values reflected the capitalized value of income, this procedure would result in an equitable tax burden distribution (provided that similar capitalization rates could be applied in all regions).

The Commission recommends that the rate of return be set at 10 percent to 15 percent, with the exact rate chosen to accord with revenue needs. Such a rate is lower than the rate of return that

would prevail in most cases, especially if small landholdings were excluded. In this connection, we recommend that the presumptive income tax not be applied to farmers with parcels of land valued at less than P 100,000. Were this recommendation followed, less than 10 percent of the approximately 1,800,000 parcels would become subject to presumptive taxation in 1971, and a large majority of farmers would thus be left outside the reach of the income tax. But the parcels included would be the medium-sized and larger properties, which represent about 60 percent of total assessed value. Once presumptive income from farming had been determined, taxable income would be computed under the ordinary rules, after personal and special exemptions had been applied. Taxable income thus determined would be combined with income from other sources, and the ordinary rates would be applied.

The Commission has considered the case for giving a right of rebuttal to farmers who could demonstrate that their actual net income fell short of the presumed value. On the one hand, to grant such a right is clearly desirable if farmers are to be treated equally with other income taxpayers. On the other hand, the existence of a general rebuttal right would tend to remove the incentive toward more intensive utilization of land which the presumptive tax might otherwise provide. This incentive would exist because the presumptive tax could render investment in underutilized land relatively less profitable and increase the relative profitability of intensive utilization. If rebuttal were permitted, the former effect would be largely removed. For this reason, some Commission members favor limiting the right of rebuttal so that it would be applicable to income deficiencies arising through natural disaster (be it floods or illness) but not to those arising through below-average intensity of utilization. Other members feel that such a limitation of rebuttal would be difficult to apply in practice and that the incentive function is, or could be, performed adequately by the property tax. The Commission is generally agreed, however, that farming losses should not be allowed as deductions against other income.

Estimates indicate that revenue from the presumptive income tax on agriculture would be substantial. On the basis of the cadastral values estimated for 1971, a 12 percent presumptive rate of return on assessed values would result in a yield increase over present levels about equal to that estimated from the increased tax collection from traders and professionals (see above). The 15 percent rate would provide a gain of nearly twice that value.

Cattle. Cattle raisers should be subject to the same presumptive tax, based on application of a presumptive rate of return to the assessed value of their land. Determination of the appropriate rate of return would be difficult, but perhaps ranches in each major cattle

raising region of the country could be identified and used as yardsticks. Carefully gathered cost and income data from such ranches could form the basis for calculating the rate of return to be presumed for other cattle land in the region. The problems that arise in allowing rebuttal of the presumption are the same here as those discussed above for farming. The Commission recommends that if cattle raising becomes subject to income tax, certain special taxes now applicable to the cattle industry be removed sometime in the future. At first, if feasible, these taxes could be collected but allowed as offsets against income tax otherwise due. These taxes include the special tax on male cattle, which is based on the value of four kilograms of meat, and the slaughter taxes. The special one percent net wealth tax, which provides funds for the Cattle Bank (Banco Ganadero) and the Cattle Fund (Fondo Ganadero), might be retained.

Further Checks on Tax Avoidance

Certain aspects of company taxation need to be considered in cases where tightening of the present provisions is called for to check tax avoidance. One such problem is the non-inclusion in salary of the value of services (meals, servants, clubs) and assets (autos, apartments, houses) provided at company expense for personal use. These values should be recorded as part of the personal income of the recipients and taxed accordingly. Any consideration of such abuses in the salary area leads to an examination of a related problem in the broad area of entertainment costs and other expenses incurred by companies on behalf of employees or customers of the firm. This subject has received considerable attention in other countries, and attempts have been made to limit abuse. The Commission recommends that this matter be explored and that limitations be imposed if needed.

Intercorporate dividends can readily be used as a scheme to avoid taxes because they encourage both "fragmentation," by which companies benefit from lower entity tax rates, and the avoidance of personal taxes on dividends through the use of entities or personal investment holding companies. Although the Commission did not consider all the technical issues in detail, it urges the application of measures that will close such loopholes efficiently, without prejudicing economically desirable business activity. [Several alternative proposals omitted.]

Bearer shares and bonds. Bearer shares (ownership of which is not registered; dividends are paid to anyone who produces them) often have tax avoidance as their major purpose. Repeated increases in the withholding rate (now about 18 percent) on bearer-share dividends have not entirely eliminated the attractiveness of this

income and wealth concealment device. The same problem exists with bearer bonds. The Commission recognizes that an absolute prohibition of the use of bearer securities would prevent their being used for non-tax purposes that might not be objectionable; but it favors measures that would eliminate tax evasion. The primary problem is that of personal income tax evasion through non-declaration of income received on bearer securities, a problem that may grow as a result of the general tightening of the personal income tax provisions which is suggested as part of the program of tax reform. To meet this situation, the Commission recommends that the withholding rate on bearer shares be increased to the top individual bracket rate. Individuals choosing to register their securities for tax purposes could be taxed at the regularly applicable rates, and the withholding rate on their dividends could be the general rather than the bearer rate. To bring one potential source of bearer security tax avoidance under government control, the Commission recommends that the government refrain from issuing bearer bonds in the future.

Net Wealth Tax

The net wealth tax, an annual tax based on the net assets of individuals (not corporations), fulfills a valuable role in the Colombian tax structure. It improves equity, encourages more efficient use of capital, and raises a significant amount of revenue. With respect to equity, the net wealth tax complements the income tax by reaching well-to-do individuals with large accumulations of wealth who, by means of avoidance or evasion, succeed in paying little or no income tax. Indeed, in the absence of the net wealth tax, these individuals would escape the payment of almost all direct taxes. If cross-checks are properly employed, use of the wealth tax records can greatly improve the administration of the income tax. Since the distribution of wealth is more unequal than that of income, the net wealth tax increases the progressivity of the tax system. Moreover, net wealth itself is taxed at progressive rates, which now vary from 0.1 percent to 1.5 percent. The wealth tax permits the taxation of increases in the value of property, which would otherwise have gone substantially untaxed because of the inadequacy of the capital gains tax. Finally, the net wealth tax contributes to equity because its tax base has been eroded by fewer exemptions than the income tax base has.

There is, however, one undesirable exemption that Colombia's definition of net wealth creates for assets situated abroad. Taxing a person's assets located in Colombia and not taxing his assets located abroad provides a tax incentive to invest abroad rather than in Colombia, and may provide a form of tax avoidance available mainly to the wealthy. This situation is clearly undesirable and

should be remedied by including in the net wealth tax base all assets, whether located in Colombia or abroad. A substantial amount of assets held abroad could potentially be subjected to the net wealth tax. Needless to say, the difficulties involved in "discovering" assets located abroad and in taxing them are formidable. The difficulties of administration do not, however, outweigh the undesirability of giving a tax advantage to persons who invest in assets abroad. The taxpayer should, in any case be required to report foreign-held assets (even if they remain exempt on his return), in order to improve the cross-checking device of analyzing the successive net wealth returns of a taxpayer to compare his reported income with the change in his net wealth from the previous year.

[ Excerpted from Richard A. Musgrave and Malcolm Gillis, Fiscal Reform for Colombia: Final Report and Staff Papers of the Colombian Commission on Tax Reform, pp. 63-67, 86-89, 98, 101. Cambridge, Mass.: Harvard Law School International Tax Program, 1971. All rights reserved; Copyright © 1971 by the President and Fellows of Harvard College. ]

[ Note: The excerpts above deal with the evasion of direct taxes. For a related discussion of evasion problems with indirect taxes (on foreign trade), see the section on "Smuggling" in Development Digest of April, 1971, pp. 31-47. A widespread problem seldom mentioned by writers on taxation is that the civil servants collecting taxes are often poorly paid, while the taxpayers they deal with may be many times richer; in these conditions either party may propose to fix the records to show a smaller tax liability than is warranted, with the tax collector sharing in the taxpayer's gain. The above article proposes an "elite," presumably high salaried, unit to investigate income tax returns; but it may be difficult to extend such status and salaries to all tax collectors, e. g. to customs men in remote ports. ]

# Improving Agricultural Taxation in India

S. S. Johl

[There has been a continuing decline in the relative contribution of agriculture to India's state revenues due in large part to the failure of government to tax adequately the higher income groups in agriculture. What is chiefly needed is a way to assess taxes on farm income based on reasonable estimates of costs and returns for defined types of farming, combined with local records on individual farm activities.]

The available evidence suggests that the contribution of the agricultural sector to total government revenues in India is low, and that its relative share has been declining over many decades. Techno-economic surveys of different states in India in 1960/61 indicated that the burden of land revenue taxation per acre was between Rs. 1.39 in Orissa state and Rs. 4.98 in Uttar Pradesh. Punjab, the most progressive state of India, had a very low burden of only Rs. 2.55 per acre. [Rs. 7.2 = $1.00] It has been estimated that the land tax revenue as a per centage of the total tax revenue in India in 1953/54 was only 8.6 percent, compared to more than 70 percent in 1839/40 and 33.9 percent in the beginning of this century. This declined further to 4.1 percent in 1965/66. To be sure the total receipts of land revenue have increased, for example by 14.9 percent between 1951 and 1959, but this increase was much less than the increase in the income from non-agricultural taxes. Generally, one could expect that as the economy of an area improves the share of agricultural taxes will tend to decrease in the total tax revenue

Dr. Johl is Professor of Economics at Punjab Agricultural University, Punjab, India.

because the tax receipts from non-agricultural sectors will increase faster as the economy moves up the growth path. Table I provides a picture of the changes in the shares of agricultural taxes in a few developing countries, most of which decreased.

TABLE I: Share of Major Agricultural Taxes in Total Tax Receipts of Some Developing Countries, 1954 through 1967 (in percentages)

| Country | Description of tax | 1954 | 1961 | 1965 | 1967 |
|---|---|---|---|---|---|
| Ghana | Contribution by farmers | - | 13.25 | 15.2 | - |
| Sudan | Agricultural tax | 4.8 | - | - | 4.8 |
| United Arab Republic | Tax on lands and buildings | 7.7 | - | 4.2 | - |
| India | Land revenue tax | - | 7.92 | 5.49 | 3.63 |
| Iraq | Agricultural land tax | 2.3 | - | 0.3 | - |
| Pakistan | Land revenue tax | - | 19.0 | - | 10.6 |
| Syria | On land, animals and agricultural produce | 16.7 | - | 8.8 | - |

Source: Computed from U. N. Statistical Yearbook.

There is no justification, however, for a decreasing burden of taxes on agriculture when the relative share of the sector in the total GNP remains unchanged, and when the proportion of the agricultural population declines or remains the same. These two factors indicate that the per capita agricultural income is increasing in relative terms, or at least does not decrease. In India, the share of agriculture in the Net Domestic Product remained almost unchanged with 49.1 percent in 1960/61, 48.7 percent in 1964/65, and 51.4 percent in 1967/68. The percentage of rural population to the total population was 86.1 percent in 1941 and 82 percent in 1961. Yet, the percentage of land taxes to the total tax revenue decreased from 7.92 percent in 1960/61 to 3.63 percent in 1968/69, and there is no substantial indication of increase in the relative contributions of agriculture in other taxes. [Editor's Comment: One reason may be that under India's constitution agricultural taxation is controlled by the states while taxes on other sectors are levied largely by the central government.]

The situation becomes more disquieting in the context of an increasing proportion of the government's expenditure being incurred for the development of agriculture. National expenditure on the development of agriculture as a percent of the total expenditure was

4. 73 percent in 1961/62 which increased to 6. 10 percent in 1968/69, and with some minor yearly variations the different states in India also present the same picture. The lower burden of taxes on agriculture becomes more evident when we examine the proportion of land taxes to the agricultural incomes. For India as a whole, taxes on land in 1967/68 worked out to be 1. 34 percent of the agricultural incomes (1962/63 to 1964/65 average). Total taxes, on the other hand, worked out to be 5. 36 percent of the total income in India. Thus, the agricultural sector in India is taxed lightly as compared to the non-agricultural sector of the economy. Of course, the average per capita income in agriculture is much smaller than in other sectors. In the agricultural sector, more than 70 percent of the total population of the country share less than 50 percent of the net domestic product; so the tax-paying ability should be higher in the non-agricultural sector. Yet with their shares in the national income remaining the same while the population balance moves towards urban areas, and with an increasing share of government revenue being spent in the agricultural sector, the relative burden of taxes is decreasing further and the increments to incomes are taxed only nominally and sometimes not at all. There seems to be considerable scope, therefore, for mobilization of resources from the agricultural sector of the economy through agricultural taxes,

The crux of the problem is that in policy discussions agriculture has carried an undifferentiated image of disadvantage, and the average sector incomes have been regarded as indicators of the level of agricultural poverty for the purpose of taxation. The heterogeneity in the distribution of productive assets in this sector has not been understood, and the disparities in incomes have not been recognized and taxed to the right extent. No doubt, surcharges and other betterment levies and taxes have been charged and enhanced with a view to making the land taxes more progressive, equitable and more elastic, yet the degree of progressiveness and elasticity has remained limited and these are hardly significant when the tax rates are so low.

The scope for increasing the share of agricultural taxes in the state revenue lies in acute disparities in the distribution of productive assets and incomes in agriculture. The Reserve Bank of India estimated that in the year 1965 the two highest asset groups, which formed 13 percent of the total rural households, held about 58 percent of the total tangible wealth of rural India. The two lowest asset groups forming 30 percent of the total households held only 2. 5 percent of the total tangible wealth. There is a great diversity of occupations in the rural areas even within the category of agriculture. In addition to arable crop farming, agriculture includes dairies, poultry, fishing, plantations, forestry, etc. The size distribution of productive assets and incomes is not available for all these

pursuits. The net domestic product from crop agriculture may be apportioned to different sized land holdings in order to get a rough estimate of the distribution of agricultural incomes. Of the total area of agricultural land, 31 percent is operated by three percent of the households, while at the other extreme 57.6 percent of the households operate 6.7 percent of the land. If pursuits such as livestock raising were considered this would further widen the disparities, because low income groups with small holdings are mainly producing foodgrain crops, while commercial dairies and poultry-raising operations are run mainly by the bigger farmers. Thus, distribution of assets and land indicate the existence of a group of agriculturalists with comparatively large incomes who are only lightly taxed in the present system.

Some Proposed Tax Reforms

From time to time, various proposals have been made for agricultural tax reforms in India. Gyan Chand suggested a land tax on the basis of the capital value of land. This proposal does not, however, distinguish between the stock of capital and the flow of incomes. If adopted, it will adversely affect capital formation, which would be suicidal to the developing economy. The Taxation Enquiry Commission (1953-54) made recommendations on the standardization of land revenue assessments and reduction in the time interval of revenue assessments. These recommendations, however, did not provide much insight to the policy makers with respect to the methods of tax assessment which would be consistent with the objectives of progressiveness and elasticity of the tax structure. The Commission, however, made a cogent suggestion that all types of incomes, agricultural and non-agricultural, should be taxed under a common income tax policy. Several more recent suggestions have favored progressive taxation of farm incomes in one way or another, but they were inadequate or arbitrary in their proposals of concrete methods for assessing such incomes and levying taxes on individual farmers.

What is needed is a schematic approach for assessment of the individual taxable farm earnings in order to make the agricultural tax structure an equitable and elastic one without losing its simplicity and compromising on productivity. An ideal tax structure must meet the test of equity and justice and at the same time should provide a sense of participation to the people at large. A reasonable scheme of taxation should, therefore, have the following characteristics:

1.) A broad-based coverage to involve the largest possible number of people. This may not be consistent with the canon of productivity, because the per capita tax yield from a large majority of the

people will be very low and in many cases only nominal, and the resulting revenue may not cover the administrative cost of keeping such records. Yet, in a democratic society endeavoring to establish a socialistic pattern of economy, it is important to provide a sense of participation to the people at large in the national development endeavor.

2.) An equitable tax burden which should be consistent with the tax-paying ability of the individuals. The tax structure should, therefore, be progressive and elastic (i. e. tax revenues should increase in larger proportions than the increases in total incomes). A progressive and elastic tax can be a strong producer of revenue.

3.) A built-in mechanism to check and remove any acute disparities in the distribution of capital assets and capital gains, without leaving serious disincentives for the process of capital formation.

4.) The tax structure, of course, has to be simple enough to be easily manageable by the public agencies and readily intelligible to the people at large.

Based on these requisites, a combination of four taxes can provide an appropriate tax structure for a developing agriculture. The first tax has to be a tax on land rent, i. e., land revenue. Since it is a nominal tax that has almost lost its relative value in total revenue, such a tax will serve mainly the purpose of providing a sense of participation to a large proportion of the rural population in India. Some proponents of equity and justice recommend exemption of small cultivators from paying the land revenue tax and many states in India have recently abolished the tax on small holdings. The incidence of this tax in India is so low that the so-called relief through exemptions of small holders amounts to only a nominal sum of no significance. On the other hand, a large chunk of the population in this process can lose the pride of participation in the national effort without any significant financial relief.

The second and most productive and significant tax should be the agricultural income tax. The requisites of equity, justice, progressiveness and elasticity demand that the tax should have a direct bearing on the tax-paying ability of the individuals. Ideally, detailed accounts of incomes of all individuals should be maintained and taxes levied under a common income tax policy irrespective of which sector the income originates from. But maintaining details of costs and returns on all farms and all sizes of enterprises and pursuits of the people will be physically impossible and prohibitive in cost. On administrative grounds, the tax assessment and collection should be fairly simple. The income tax assessment, therefore, has to be based on a combination of (1) some details of individual farm

production programs, and (2) reasonable standards in respect of some variables such as acreage yields and returns. Updated standard coefficients of yields and production costs of crops and other farm activities will be needed for different types of farming areas.

The individual farm details can be recorded and maintained by the village revenue clerks (Patwaris) without much additional cost in areas where such an agency already exists. Where such an agency does not exist, it should be established in any case in order to have a broad and reliable base for agricultural statistics. Area-wide updated standards of costs and returns can be worked out by the agricultural economics research institutes and agencies of the states and the agricultural universities. Initially, where the system of record keeping is lacking and must be introduced, records could merely specify which parcels of the land are irrigated, and only generally grown crops might be considered. There should not be, however, any limitation on the subsequent elaboration of standards to cover other variations in land quality and other crops and crop varities. Crop patterns of all kinds, dairying, poultry raising, or any other commercial activities can also be included, and specified in the production programs of the individual farmers. A little extra effort on the part of the village Patwari, coordination of his activity with the village council (panchayat), and a little more careful supervision can turn out reliable records of the production programs of the farmers. On average or reasonable yields and returns, reliable data are already being generated in respect to all types of farm activities. This can be updated at nominal extra cost. These extra efforts do not involve much additional cost, and to the extent they do the money is worth spending in the interest of improving the general statistical base for agriculture policy research and administration. This system has the advantage of introducing flexibility in the tax structure. Tax rates can be easily revised when desired to make them more equitable and progressive or more productive.

A point of emphasis is that reasonable yield and returns standards can be determined, keeping in view weather and other uncertainties. The problem is that in spite of taking account of the weather and other uncertainties, the actual returns of individual farmers will go below or above these standards. Individual efforts and management can make a significant difference, even if such standards are worked out for completely homogeneous types of farming areas and types of farms. Yet, this is a strong point in favor of a system of using standard yields and returns for the purpose of tax assessment. The individual who obtains higher returns than the standards gets rewarded for his efficiency and efforts. Those who produce less than the standards are penalized for their inefficiency.

The third tax has to aim at reducing disparities in the distribution of capital assets beyond certain reasonable limits. This has to be, therefore, a tax on capital assets; yet, at the same time, it should not leave any serious disincentives for new investments. In the early stages of growth, incentives need to be consciously planned and strengthened in order to initiate and accelerate the process of capital formation in the developing agriculture. While reduction in tax rates and investment rebates on tax liabilities can encourage capital investments, a tax on capital assets can, if inappropriately structured, provide a strong disincentive. The recent imposition of a wealth tax on agricultural lands and other rural property in India is an example of such an ill-conceived tax, which is liable to hit hard the capital formation process and tell upon the efficiency in the agricultural sector through the subdivision of holdings. An appropriate tax in this category is the death duty or an inheritance tax. The society (government) is logically entitled to such a share in the property passing in inheritance because it had helped the individual in building up his property through creating a healthy investment environment and perhaps through tax rebates and incentives on investments. Such a tax should not provide any serious disincentives in the lifetime of the individual because the immediate incentives of tax rebates can more than counterbalance the after-life considerations. At the same time, the tax provides an effective check on the generation to generation transfer of cumulative wealth, which, if unchecked, may lead to acute disparities and an economic as well as social polarization in the society.

The fourth tax is a tax on gifts and capital transfer gains. This taxes the property transferred during the lifetime of the owner and keeps in check the transfers of property to avoid inheritance taxes.

[ Excerpted from "Agricultural Taxation in a Developing Economy: A Case of India," Indian Journal of Agricultural Economics. Bombay: Indian Society of Agricultural Economics, Vol. XXVII, No. 3, July-September 1972, pp. 1, 3-9, 12-17. Copyright © 1972 by Indian Society of Agricultural Economics.]

# Taxation Trends

Jacob Meerman

[An IMF study of trends in the taxes of developing countries indicates that an increasing proportion of their growing incomes is being collected as tax revenue. The fastest growing type of revenue is from taxes on domestic sales and production; income tax revenue also grew. Some figures on national "tax effort" are presented.]

As part of a broad tax study the International Monetary Fund (IMF) has collected comprehensive tax data on 27 developing countries for 1953-55, and on 50 such countries for 1966-68; the larger sample includes the smaller. In the large sample, the 24 countries with the higher per capita incomes (the average was $399) had an average tax ratio—ratio of tax revenues to GNP—of 15.5 percent; the poorer 26 countries (averaging $110 in GNP per capita) had a 12.3 percent average tax ratio. There is thus a positive association of tax levels with income, but as Table 2 (below) shows there are wide variations in the tax ratios which are not explained by income levels.

For the 27 countries where data are given for both periods, the average tax ratio increased from .114 (1953-55) to .138 (1966-68). Over the 13 year period the average elasticity of taxes to GNP was 1.4, i.e., the percentage tax increase was 140 percent of the percentage increase in GNP. The marginal tax rate, that is, the average proportion of the increase in incomes in the period which was collected in taxes, was 15 percent. This suggests that efforts to increase taxes were generally successful, although the extent to which success was due to particular kinds of effort is unclear. As the study states:

Dr. Meerman, formerly with the U.S. Agency for International Development, is an economist at the World Bank, Washington, D.C.

> The increase in total tax revenue and the changes in its composition are due to the introduction of new taxes, increases in rates and broadening of coverage of existing taxes, improvements in administration and compliance, and the automatic response of tax yields to the growth of the bases of various taxes. While no quantification of the separate influences of these factors has been attempted, it appears that the rise in the average tax ratio and the changes in revenue composition reflect much more the consequences of additional tax measures than automatic flexibility.

Structure of taxes. Economists looking for patterns of evolving tax structure that reflect stages of economic development generally agree that as per capita incomes increase, tax ratios increase, and that foreign trade taxation tends to decline relatively, while direct taxes on personal and business incomes rise relatively. The IMF study results support this statement. In addition, however, it shows that sales and excise taxes were the most rapidly growing revenue source in the period covered.

In the smaller sample, the arithmetic average shows income taxes—including taxes on both personal and business incomes—accounting for 22 percent of total tax revenues in 1953-55 and increasing to 24 percent for 1966-68 (Table 1). In the larger sample (only 1966-68), the 24 countries with the higher per capita incomes had an average ratio of income taxes to GNP of 5.1 percent; for the 26 poorer countries the ratio of income taxes to GNP was 2.2 percent.

The data on foreign trade taxation generally support the thesis of relative decline. The averages in Table 1 shows export taxes declining from 9.6 to 7.3 percent of total taxes in the 16 countries with data available. The import tax data, averaged for the 23 countries available, show a decline from 27.3 to 26.4 percent. In general, it appears as though trade taxation has been declining, with perhaps the larger share of the decline occurring in export taxation. The cross-sectional data reinforce this conclusion: in the fifty country sample, international trade taxes accounted for 28 percent of total tax revenues for the 24 richer countries, and 38 percent for the 26 poorer countries (the study does not distribute these trade taxes between exports and imports).

In the comparisons over time, a dramatic change is the leap in internal indirect taxation, the "taxes on production and sales." In Table 1, the averages show these taxes increasing from 29.5 to 35.7 percent of the total. Sales taxes account for most of this increase:

> The increase in the share of these taxes has been brought about both through the more intensive use of excises [taxes on production] and by the adoption and expansion of sales taxes . . . Whereas the average share of excises has increased from 17.9 percent to 19.6 percent of the total, that of sales taxes has increased from 6.9 percent to 12.9 percent. And in 11 out of the 30 sample countries. . . sales taxes of one kind or another were introduced after the first period.

The rise in sales and production taxes was only weakly related to increases in per capita incomes. Cross-section data show that the top 24 countries collected 4.7 percent of their GNP in these taxes; the bottom 26 collected 4.0 percent. However, because the average tax ratio of the richer countries was higher, 33 percent of total taxes were production and sales taxes for the bottom 26, while such taxes accounted for 30 percent of the top 24 total.

Table 1: Composition of Tax Revenue in 30 Developing Countries
(in percent of total revenue)

| | Direct Taxes | | | Indirect Taxes | | |
|---|---|---|---|---|---|---|
| Averages for countries* | Income Taxes | Taxes on Property | Poll and Personal Taxes | Import Taxes | Export Taxes | Taxes on Production and Internal Transactions |
| 1953-55 | 22.4 | 8.6 | 0.72 | 27.2 | 9.6 | 29.5 |
| 1966-68 | 24.0 | 6.3 | 0.06 | 26.4 | 7.3 | 35.7 |

*In computing these averages, the countries for which information on a particular tax share was not available were excluded. Hence the sum of the averages of shares of particular taxes will not add to 100.

Generalizing from the time-series sample (26 countries in this case), property taxes were fairly important in the 1950s in many countries. However, by 1966-68 they had declined in average relative importance from 8.6 percent of total taxes to 6.3. In many countries property taxes have been insignificant; in the fifty-country sample, 18 countries had a property tax to GNP ratio of less than one half percent. This suggests an unexploited tax base of considerable potential.

Evaluating fiscal effort. The study makes a statistical analysis relating a country's overall tax ratio to per capita non-export income,

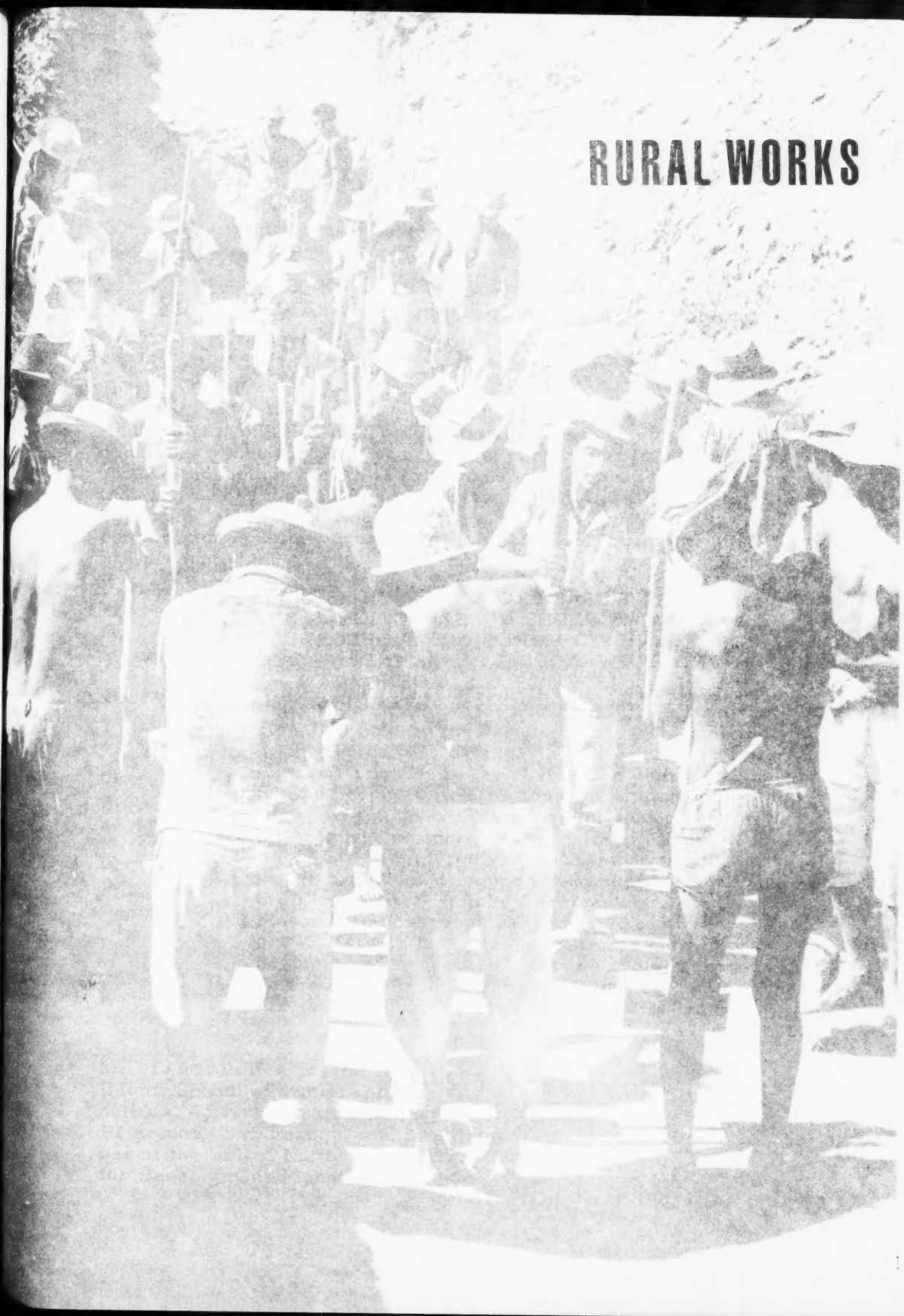
## Table 2: Tax Rates and Index Values of Tax Effort, 50 Developing Countries

| 24 Higher Incomes | Taxes as % of GNP 1966-68 | Taxes as % of GNP 1953-55 | Per capita GNP (U.S. dollars) | Index of Tax Effort |
|---|---|---|---|---|
| Zambia | 28.6 | - | 297 | 1.18 |
| Venezuela | 21.8 | - | 871 | 0.97 |
| Brazil | 20.6 | 15.3 | 304 | 1.78 |
| Guyana | 20.6 | 16.7 | 332 | 1.03 |
| Ivory Coast | 19.7 | - | 280 | 1.43 |
| Chile | 19.4 | 10.1 | 623 | 1.18 |
| Iran | 19.4 | - | 276 | 0.97 |
| Jamaica | 16.9 | 12.6 | 493 | 1.03 |
| Malaysia | 16.8 | - | 316 | 1.02 |
| Trinidad and Tobago | 15.2 | 15.5 | 713 | 0.70 |
| Taiwan | 14.9 | 14.9 | 262 | 1.12 |
| Argentina | 14.8 | - | 670 | 1.10 |
| Turkey | 14.1 | 11.7 | 347 | 1.16 |
| Peru | 13.7 | 12.2 | 368 | 0.92 |
| Ghana | 13.3 | 18.2 | 278 | 1.02 |
| Ecuador | 12.6 | 12.8 | 236 | 0.98 |
| Singapore | 12.5 | - | 645 | - |
| Costa Rica | 11.0 | 11.5 | 445 | 0.81 |
| Lebanon | 10.7 | 10.4 | 507 | 0.86 |
| Honduras | 10.5 | 6.7 | 249 | 0.75 |
| Colombia | 10.3 | 10.3 | 391 | 0.80 |
| Mexico | 9.9 | - | 492 | 0.77 |
| Paraguay | 9.5 | 5.0 | 225 | 0.80 |
| Guatemala | 7.9 | 7.6 | 305 | 0.65 |
| **26 Lower Incomes** | | | | |
| Congo (Dem. Rep. of) | 23.4 | 16.2 | 86 | 1.44 |
| Tunisia | 20.7 | 15.5 | 217 | 1.30 |
| Senegal | 18.2 | - | 224 | 1.38 |
| United Arab Republic | 18.0 | - | 183 | 1.34 |
| Morocco | 16.5 | 10.0 | 196 | 1.16 |
| Ceylon | 15.7 | 16.3 | 144 | 1.27 |
| Mali | 15.0 | - | 69 | 1.37 |
| Tanzania | 14.4 | - | 64 | 1.06 |
| Kenya | 13.9 | 13.1 | 117 | 1.16 |
| Chad | 13.7 | - | 70 | 1.22 |
| S. Vietnam | 13.7 | - | 151 | 1.18 |
| Somalia | 13.7 | - | 85 | - |
| Sudan | 13.0 | - | 104 | 1.10 |
| Upper Volta | 13.0 | - | 49 | 1.18 |
| Thailand | 12.8 | 10.8 | 156 | 1.00 |
| S. Korea | 11.8 | 5.7 | 168 | 0.97 |
| India | 11.6 | 6.3 | 84 | 1.05 |
| Togo | 10.2 | - | 131 | 0.71 |
| Philippines | 9.8 | 7.0 | 184 | 0.77 |
| Burundi | 9.5 | - | 51 | 0.86 |
| Bolivia | 9.0 | - | 160 | 0.54 |
| Ethiopia | 8.6 | - | 61 | 0.78 |
| Pakistan | 8.3 | 6.2 | 118 | 0.75 |
| Rwanda | 8.3 | - | 48 | 0.70 |
| Indonesia | 7.5 | 6.2 | 80 | 0.62 |
| Nepal | 3.2 | - | 81 | 0.30 |

the ratio of exports to GNP (mineral exports excluded), and the share of mineral production in GDP. These three variables—using a regression equation— accounted for 39 percent of the variation in the tax ratios of the fifty-country sample. The remaining variation among the countries is considered as due to "tax effort" of the individual countries. The latter in turn can be measured by deviations from the regression line, i. e., from the estimated tax ratios obtained by the formula based on the values of the explanatory variables. By combining with appropriate weights a country's values for per capita non-export income, the export ratio, and the share of mineral production, the regression analysis "cranks out" a predicted tax ratio, which is roughly what the country concerned would have had if it had made the average tax effort: in "high tax effort" countries the actual ratio exceeds the predicted ratio, and vice versa. In the IMF study an index of tax effort is defined as the ratio of the actual to the predicted tax ratios (see Table 2). According to this measure, Brazil's tax effort was about 1.8 times that of the average performers (Ghana, Malaysia, Thailand). At the opposite extreme was Nepal with 30 percent of average performance.

As the study states, this technique must be used with caution. While better than simple comparisons of actual tax ratios, the technique still leaves over three-fifths of total variation unexplained. It is entirely too much to ascribe all of the remaining variations to differences in "effort." A host of factors beyond government control, and not readily grasped in statistical formulations, probably account for much of the unexplained variation. Nevertheless, where these index values are very different from 1.0—e.g. above 1.2, or below .80—they appear to have some importance.

[Excerpted from Fiscal Research Summary Papers, Document ERP No. III 293. Washington: U. S. Agency for International Development, 1971. The study described is in the IMF Staff Papers, Vol. XVIII, No. 2, July 1971, pp. 254-331.]



# RURAL WORKS

RURAL WORKS PROJECTS SUCH AS THE SMALL DAM SHOWN UNDER CONSTRUCTION IN BRAZIL ARE PROVIDING EMPLOYMENT OPPORTUNITIES WHILE DEVELOPING RURAL INFRASTRUCTURE. [PHOTO: U.S. AGENCY FOR INTERNATIONAL DEVELOPMENT]

# The Public Works Approach to Low-End Poverty Problems

John P. Lewis

[ The most promising method of attacking the problems of developing countries where the poorest groups in society fail to benefit from national economic growth is to provide employment in public works that will add to the nation's productive potential. Reasons for this approach, as opposed to alternatives, questions of financing, and the contributions public works could make to rural locational planning are presented. ]

There can be no doubt about the new strength or pervasiveness of concern over employment and low-end poverty in the developing world today. The shift of attention on the part of the United Nations Committee for Development Planning in this regard, signalled both by the agenda for its 1972 meeting and by the topics it is earmarking for special attention as it participates in the review and appraisal process for the Second United Nations Development Decade, is representative. The problems that give rise to this upsurge of concern are, of course, not new. But it has been perceived that they have become worse or, at least, more threatening. The 1960s—the First United Nations Development Decade—came closer than observers had expected to achieving the growth targets that had been chalked out for it at the beginning of the decade. But the 1960s were a failure on the equity front. In many countries, indications are that manpower redundancies which had been

Mr. Lewis is Dean of the Woodrow Wilson School of Public and International Affairs, Princeton University, Princeton, New Jersey, and is a member of the United Nations Committee for Development Planning.

evident since the beginning of development efforts grew worse. At the start of the 1960s most developing countries had radically unequal income distribution and, therefore, masses of poor people at the lower end of their economic scale. Data on what happened to their income distribution during the decade are sketchy or unreliable. But such evidence as there is suggests that the inequalities, if anything, worsened.

A policy discussion on the employment and poverty issues of the developing economies must start from some assumptions about the nature of the problem. One premise, that the problem is big and important, has been indicated. Two others may be mentioned. First, it is presumed that there is little point in debating at length whether the root of the problem is an "employment" matter or an "income" matter. It is both. It is a matter of "left-over people." In many countries, development to date has proceeded in such fashion that large fractions of the labor force have annual outputs per worker that are dismayingly low even when measured by the average productivity standards of their own countries. In a productivity sense these people have a large measure of functional idleness, and as a result, their per capita incomes also are dismayingly low.

Secondly, I assume it will serve the present purposes to hypothesize that the discussion concerns countries that have entered the 1970s in roughly the following condition: whatever their manner or degree of central planning, they have a concerted government-led development effort that has been doing rather well by conventional GNP growth standards, that they have been averaging about 5-6 percent annual expansion in real output, and that in achieving such progress, almost all these countries are pressing hard on their foreign-exchange restraints. Most of them also find the funding of their present domestic government budgets difficult. And yet they have been accumulating—or at least they possess, whatever the short-run trend—large, stubbornly persisting balances of "left-over people."

As a practical matter, therefore, the need for an "antipoverty policy" arises in a context where there already is a reasonably strenuous, on-going development effort, already pressing on some of the more critical resource constraints of the system, but where there is now perceived to be a need for doing something extra to cope with the unsolved problem of the low-end poor. Formulating the policy problem this way immediately raises fundamental questions: instead of antipoverty policy being conceived of as something that must be added to existing development policy to correct shortcomings in the latter, should not the whole of development policy be recast from the ground up to eliminate the problem that antipoverty policy would correct? Is not the very presence of large numbers of

"left-over people" with productivity far below average sufficient evidence of inherently bad planning, of an accumulation of misguided (insufficiently labor-intensive) process and product choices? Should not countries with mass poverty problems reorder their priorities, putting the promotion of equity and the equalization of opportunities to participate in the modernization process at the center of their constellation of development goals?

Few economists can fail to sympathize with this critique of the development-policy status quo. Yet this paper assumes the advisability of conceiving of antipoverty policy more as an addition to existing programs than as a total reconstruction of them. First, I doubt the political and bureaucratic practicality of the alternative approach in many countries in the near term; and if the prevailing sense of urgency is right, the near term is critical. Secondly, there is abundant reason to guard against emotional over-reaction with regard to the relevance of output targets. Incomplete as it may be as a social goal, higher economic welfare per capita is still the object of economic development; and in poor countries it can be obtained only by increasing average output per capita. Egalitarian full employment could be achieved if everyone went back to scratching for roots and berries, but that is not what is desired.

## The Place of Public Works in an Antipoverty Program

No single policy approach—whether that of expanded public works or some other—is likely to be a sufficient antidote to severe low-end poverty. Governments disposed to attack the problem seriously will need to adopt a variety of measures, and the degree of reliance that can be placed on public works will depend on the circumstances of each particular country. Yet if one is speaking of initiatives that can have major impact in the near and medium term—let us say during the 1970s—there is abundant reason to emphasize the public works brand of antipoverty policy. Partly this is because of the positive attractions of the approach itself, which will be referred to shortly. But, in part, its relative feasibility and importance derive from the limitations that will beset alternative policies, especially in the near future.

This last is obviously true, for example, of population control policies. Such policies probably are indispensable to the long-term elimination of underemployment and poverty in the developing countries. But no intensification of such efforts can have any impact on equity and employment in this decade. Likewise, purely redistributive solutions to the low-end poverty problem—solutions that, without expanding production, would promote equity simply by transferring income from the richer to the very poor, or by

transferring assets, mainly land, to the landless—are not promising in countries where average income levels are still very low. Such reforms face political difficulties. In some countries, such as India, it has been demonstrated of late that even the most radical land redistribution program politically possible could not begin to reach most of the landless and poorest people in the countryside; if holdings are to remain viable, there simply is not enough land to go round. Moreover, in poor countries where "left-over people" represent the economy's most evident under-used productive resource, any antipoverty program that raises low-end incomes without raising low-end producitivity, and therefore fails to convert idle manpower into added production, is, in aggregate welfare terms, a second-rate solution.

Among some neoclassical economists in the market economies it has become fashionable to attribute the whole problem of labor redundancy in the developing countries to a cumulative record of bad technological choices and bad factor pricing. There is an accompanying tendency to assume that the solution lies in raising the price of capital in relation to labor and thereby inducing more labor-intensive technological choices henceforward. Capital certainly has been underpriced in many development projects. Letting users pay the full cost of the scarce resource—for example, in the case of labor-displacing farm machinery—can promote better resource allocation, stimulate internal saving and provide a market-adjustment contribution to the problem of idle manpower. But it would be foolish to look only to this source for the answer to the low-end poverty problem. In the first place, in a world of countries with such radically differentiated levels of per capita income as have been evolved during the past century, international economic intercourse is bound to keep indigenous factor-price structures distorted. Such is the effect not merely of the errors that government planners and foreign-aid agencies have made in costing capital and choosing technologies for particular development projects. It is also inherent in such processes as the spread of unionization and industrial labor standards, international traffic in professional skills and the consequent attempts of the developing countries to stem their so-called "brain drain," the fact that most of the world's existing technology comes from capital-abundant sources, and the impact of foreign private investment on the pricing of capital and on technological choices. In combination, all these factors tend to pull the price of capital below, and the price of that portion of the labor force engaged in the modernizing sector above, market-clearing levels.

Moreover, the answer that developing countries should solve their low-end poverty problems by revising their technological choices assumes the existence of technological alternatives that in many instances do not yet exist. Because of the labor-saving preoccupations

of the capital-rich systems from which most of the existing technology comes, much of the efficient labor-intensive technology that is, as it were, implicit in mankind's shared scientific frontiers has not yet been developed. If it is to be developed, this will have to be done in large part in the developing countries themselves. Thus demands that low-income countries forthwith shift to more appropriate technologies often implicitly assume the effective operation of indigenous institutional capabilities for adaptive and original technical innovation that many developing countries are only beginning to build and that probably none yet has in adequate measure.

The foregoing considerations reinforce the view taken by this article that if antipoverty policy is to be developed adequately, there must be heavy reliance on some kind of additive activity that is labor-intensive, that has a direct distributional impact on the low-end poor, and that engages these "left-over people" in useful and productive work. Another criterion for such an effort is that it should be of a type that does not impede the economy's longer term rationalization of its technological choices and factor pricing, or encumber its ability to compete in export markets or otherwise interfere with the efficient development of its progressive sectors. This criterion casts doubt on several of the more obvious possibilities: the promotion and subsidy of traditional labor-intensive "cottage industries" that have lost their ability to compete in the open market can, particularly if the policy entails the reservation of certain product lines for such producers, hamper the export capabilities of the countries concerned. So can attempts to force redundant manpower on modernized industry. Similarly it seldom would be feasible or sensible for governments of developing countries to attempt directly to induce major expansions of employment in internal trade or in private services as antipoverty measures.

In the absence of some other generator of employment, agriculture surely will prove to be the residual employer in most of the countries that concern us. The poor in poor countries can seldom long afford total idleness. Lacking alternative employment, the rural poor will tend to divide up such agricultural employment and income as there is. But their misery will mount. What is needed in the near term is a major increment in "third sector" employment, standing, as it were, between modernizing agriculture on the one hand and modernizing industry on the other. Such, as I see it, is the appropriate mission of additive public construction.

In general, public works construction has the following advantages as an antipoverty initiative: (a) Construction is technologically fairly plastic; in low-wage economies labor-intensive modes of construction tend to be relatively cost-effective. (b) Accordingly,

the share of labor costs and, more particularly, of unskilled labor costs in the total project costs can be high—which is to say, large fractions of antipoverty outlays can be directed to the low-end poor. (c) Compared with other forms of additive employment, public construction is likely to have few adverse effects on the efficiency of the progressive sectors of the economy or on their competitive, capacity in international markets. (d) At the same time a major expansion of rural public works can, by placing additional demand on the rural labor market, be the most effective means in some countries of improving the bargaining position of agricultural labor and thereby of promoting the income redistribution that an antipoverty program requires. (e) Public works programs can also, by giving large numbers of villagers their first acquaintance with non-agricultural operations and work disciplines, serve as a useful transition between agriculture and other non-agricultural employment. (f) As for its potential aggregative proportions, public construction is in principle variable and controllable. It can be undertaken on whatever scale a government wishes or can finance; and, subject to the lags in decision-making and implementation, it can be varied incrementally. (g) Finally, the variety of projects with high social and benefit-cost characteristics that are still not built is enormous. In hundreds of thousands of villages in the developing world there is a pressing need for irrigation channels, drains and land levelling; between the villages and the rural marketing centers there is a need for more and better farm-to-market roads; the rural centers require storage and marketing facilities, schools, training installations, health and family planning facilities; the towns have glaring infrastructure deficits; and many countries still lack the kind of national highway system that can effectively articulate their national markets. For as far ahead as it makes any sense to judge, there need be in most countries no shortage of public works projects with high social returns.

## Issues of Scale and Financing: The Internal-External Financing Mix

If antipoverty efforts are to be mostly additive to other on-going programs, efforts to launch bold new public works programs are bound to encounter financial constraints. This is because the typical country does not turn to the problem with much spare financing capacity, either at home or abroad. The question is whether, in the cause of attacking low-end poverty, these financial barriers can be pushed back. Big programs really are worth talking about only in cases where there is a government or a group of aid donors, or preferably a combination of the two, that is determined to make a redoubled fiscal effort in order to attack the low-end poverty problem.

In the case of additive public works, external and internal financing are substitutes, but they are not symmetrical. For simplicity's sake, it may be assumed that the discussion concerns a public works program with no direct import content. Whether a works program is internally or externally financed, it will have the same direct effects on output and productive capacity. When the new facilities it produces are completed, they will tend to add to the ability of the economy to produce and therefore to its capacity for non-inflationary absorption of deficit financing. But while the works are still under way they add to output only the value of the construction activity itself. This last is not a fungible resource available for meeting the demands, direct and indirect, generated by the construction.

The different effects of internal and external financing flow from the different degrees of induced consumption and induced market-responding investment they allow the works program to generate. At one extreme, a government can raise internal taxes and savings enough to offset the increased consumption expenditure generated by an additive public works payroll and the increased demands that the non-wage portion of the program expenditure places on intermediate products. This is not quite "pure redistribution" because GNP does rise by the value of the construction itself, just as employment rises by the value of program employment, but there tends to be no net inducement of consumption or non-program investment (the expansive effects of the program being balanced by the contractionist effects of the added taxes and savings). In the short run, aggregate real consumption stays the same; real income is shifted to the poor; and, in the absence of net induced consumption and investment, there is no increase in net imports nor in the need for foreign exchange.

The opposite extreme would be additive public works wholly funded by extra foreign aid. In such a case the economy acquires a full measure of added real resources (of which it avails itself by converting the extra aid into extra net imports) for supporting the added construction activity. Broadly speaking, there is no need for redoubled internal financial discipline to maintain the same degree of resistance to inflation as that in effect before the program started. There is no need for an upward shift of internal tax and saving functions to offset the demand-expanding effects of the works program. Consequently the program does cause a net inducement of added real consumption. The latter, in turn, does stimulate new market-responding investments. These, as far as over-all growth is concerned, add to the aggregate capacity-expanding effects of the works program itself. The induced consumption and induced investment account for most or all of the requirements that the program generates for net imports. And, thanks also to the induced consumption

and investment, the total employment generated by the program is some multiple of that directly provided by the program itself.

No scheme for financing a major, comprehensive public works program can be discussed until there is some idea of the size of the direct program that the underemployment and low-end poverty problems of the economy invite. Conversely it has just been shown that, because of the differential effects on induced consumption and investment, one cannot estimate the total employment and the income-expanding and output-expanding effects of a works program—and therefore it is not possible to estimate how large a direct program is required to meet specified aggregative "needs," until it is known what the internal-external financing mix of the program will be. The result is that planners seeking to develop serious, major works programs must jointly consider and answer the problems of (a) program scale and design; (b) program financing. As they approach the problem of scale, they should remember that whatever tentative choices they are disposed to make between internal and external financing (which choices they are apt to have to re-examine in the light of their initial estimates of the needed scale itself) will tend to have the following broad consequences:

(a) The higher the portion of external financing, the higher will be the total addition of resources associated with the program and the larger will be the share of indirect versus direct gains in output, consumption, investment and employment attributable to the program. Likewise, the higher the contribution of external financing, the larger will be the results to which a public works program of given budgetary size will lead; and (thanks to the room for induced consumption and investment that external funding provides) the greater will be the stimulus to the growth rate of the economy produced by the program;

(b) The lower the share of external financing, the greater will be the degree to which the total benefits of the program will be channelled towards those people, namely, the poor, who are to be directly employed on the works program itself, for whose benefit the program presumably was undertaken in the first place.

Setting Targets for Public Works

If governments want to break away from the pilot-project tokenism that has enervated the public works approach in the past, it is essential that planners systematically relate the scale of their anti-poverty effort to estimates of the prospective requirements of their economies for extra employment and low-end income. It has been emphasized that all governments will, at the start, find their data for such target-setting exercises extremely unsatisfactory. But

the best way to stimulate improvements in the data, as well as to get on with the policy task at hand, will be for each concerned government to press ahead to make these initial, fallible, estimates.

Each concerned government should ask itself the following questions. How many extra jobs (full-time, seasonal or other), in addition to those now in prospect, will the economy need by the end of the next planning period? Considering the initial assumptions made by the planners about the internal-external financing mix, what are their estimates of the multiplier and accelerator processes that would be triggered by added antipoverty expenditure? Accordingly, what portion of the needed extra jobs must be directly generated? What portion of these directly generated jobs should be provided by public construction? Assuming that the procedures of the program for choosing projects and for choosing the construction techniques they will employ will be given as strongly a labor-intensive bias as is consistent with reasonable efficiency, and taking account also of the government's rough anticipation of the program's project composition, what average division between labor and other costs is foreseen for the program budget? Given the wage rates that it is proposed the program should pay, what level of additional government spending does the economy's needed increment in public works employment imply? What further income-redistributing effects is the program likely to have by placing additional demands on the general market for unskilled labor, and therefore bidding up the prices of that labor —in particular, the price of landless agricultural labor?

Despite the crudeness of the targets that they can formulate from the answers to such questions as the foregoing, planners should not fear to adopt them for policy purposes, provided that an implementing government is organized to monitor and adjust a works program as it proceeds. The minimum lags that will be involved in scaling up the financing and the organization of a major program should be sufficient to leave substantial scope for course corrections as the program proceeds.

## Increasing Resources for Public Works

In some countries, of which India is an outstanding example, food supplies have in fact been the most severe resource constraint that has stood in the way of major resort to employment-oriented public works. This has been so even though a great deal of external food assistance was provided during the 1960s, for in the past the bulk of such food aid (virtually all of it in the Indian case) has been swallowed up by the indigenous food deficits that existed in the absence of further activation of idle manpower. Food supplies therefore have been highly inelastic, and under these circumstances the substantial expansions in food demand that major increments in public works activity would

have generated would have caused sharp rises in food prices, including those in urban areas. Sharp, abrupt, urban food-price inflation is about as politically disruptive an economic phenomenon as any with which the governments of developing countries have to contend.

The likelihood that in some parts of the developing world, this obstacle can be overcome in the 1970s constitutes the clearest new opportunity for bolder anti-poverty policy in this decade. First, and principally, the opportunity results from the agricultural acceleration under way in a number of countries. In all such cases, governments should closely examine what new degrees of resource freedom the improving of agricultural performance may be creating for expanded antipoverty outlays that are not unacceptably inflationary.

In principle, of course, food aid remains a second means of alleviating a food-supply bottleneck, and it is illogical to think of it only as an alternative to domestic agricultural production— one that can be superseded as soon as the expansion of the domestic food output begins to accelerate. On the contrary, the two can supplement each other and together provide a greater degree of freedom for antipoverty policy than can either separately. Indeed, in the past, as just noted, despite much talk about idle manpower mobilization via food aid, most such aid has gone for basic deficit-filling. Thus in some countries the "green revolution" is creating the first real opportunity for food aid at the margin to be put to the kind of antipoverty uses about which both donors and recipients long have theorized.

However, even with fewer restrictions with regard to food, governments disposed to pursue antipoverty public works efforts on the scales needed are going to have to find ways— especially in a world of diminishing foreign assistance—of raising substantially more funds internally than they previously have thought feasible. The following appear to me to be among the principal possibilities for further noninflationary funding of antipoverty efforts:

Intensified conventional tax and other resource mobilization efforts by central governments. Tax programs run from the capitals of developing countries vary considerably in their ambitiousness and in the quality of their enforcement. Likewise there is much variance in the effectiveness with which public-sector enterprises are operated to earn fiscal surpluses and with which private savings are mobilized via governmental and quasi-governmental financing intermediaries. Yet it will be a rare case where a significant further contribution to the financing of a bold antipoverty program cannot be extracted from these conventional, central fiscal sources.

A greater shouldering of the additive public works fiscal burden below the national level. The organizational formula for greatly

expanded public works to be advocated below will emphasize the importance in many countries of far greater decentralization of responsibility for the design and conduct of public construction to subnational and especial local jurisdictions. In many countries, if such organizational reforms were genuine, this would open a major opportunity, not just for re-allocating revenue and private-saving sources at governmental levels, but for tapping sources now largely missed at the local (especially rural) level.

Capturing to public account the land-value windfalls attending urbanization. The phenomenon of capital gains as land-use changes from agricultural to urban, and the fact that these unearned gains can in principle be socialized without hindering the productive process, have been long recognized. But few, if any, developing countries, at least of the market-economy type, recognize the scope of this potential for public development financing as they look to the decades ahead. Nor have many of them contrived techniques, whether of real-property taxation, of government acquisition and subsequent resale of transitional areas, or of any other type, that more than scratch the potential. If countries will make conservative projections of the further urbanization they can expect in the next several decades, and will then estimate the flows of unearned income that are bound to accrue to someone from this process, they will find they have abundant incentive to invent or perfect fiscal mechanisms for capturing larger fractions of these gains to public account.

## Project Organization and Implementation

In programs that will depend to a great extent on local labor and may involve large numbers of localized projects, with each requiring adaptation to the local environment, there is urgent need to engage local energies and to lodge program responsibility at the local level. These organizational issues are exceedingly complex. Moreover, the answers to them necessarily are so peculiar to the institutional idiosyncrasies of individual countries that at first sight it seems impossible to generalize about them at all. Yet there is one theme common to many of them, namely, centralization versus decentralization. It would appear fundamental that an activity which is so inherently localized as labor-intensive public construction is likely to be, and which must be so dependent on mobilizing local initiatives and local resources, cries out for a highly decentralized pattern of control. On the other hand, a number of the other concerns—that the program be coherent, consistent with the national development plan, technically competent and not corrupt—typically motivate national governments to maintain tight (and, from the viewpoint of "activating the locals," deadening) central control over such ventures.

LIBRARY
EASTERN MICHIGAN UNIVERSITY
YPSILANTI
U. S. DEPOSITORY DOCUMENT

The formula for resolving the centralization-decentralization issue requires the delegation downward of substantive decision-making as to project choice and management; central control of the key procedures by which local jurisdictions conduct their decentralized operations; and enforcement of the prescribed procedures by a matching-grant mode of funding which also creates effective incentives for the mobilization of resources by local authorities.

The procedural requirements which such a pattern of administration might impose on local authorities might concern such matters as the capacity and use of local planning agencies, the presence and use of local cells of engineering and other technical expertise, financial accountability, and the maintenance of those previously constructed facilities for which the local authorities remained responsible. It would be appropriate for any central government undertaking a major antipoverty program so organized to provide training, consulting facilities and other technical assistance to develop the ability of its local jurisdictions to meet the necessary standards. In antipoverty programs of the breadth envisaged here the number of local decision-making centers would be too great for it to be possible to deploy foreign technical assistance personnel to any large number of them, even if such personnel were acceptable to host governments. But a number of developing-country governments could be far more enterprising in facilitating access on the part of their lower jurisdictions to the reservoirs of expertise represented by their own nationals within their countries.

The organizational pattern outlined above would provide a solution to the competing claims of an antipoverty construction "program," on the one hand and, on the other, of the specialized functional and/or departmental activities that would operate many of the structures built by such a program. In a substantively decentralized pattern, central program funds would be passed down on a matching basis to local jurisdictions noncategorically, without instructions as to the functions—irrigation, roads, public market facilities, schools, or whatever—for which facilities were to be constructed. This would be left to the local authorities to decide. But in the case of projects which would be turned over to the functional departments for operation or whose operation would be subject to departmental control, the local authorities would be obliged to make the projects conform to the professional and technical standards of these departments. In this manner an additive public works program could project a clear pro-employment, antipoverty thrust, maintain clear aggregative fiscal outlines and, if the government chose, be given a special-purpose, central management. Yet the program would not end by filling the countryside with orphaned projects for which the regular governmental structure was unwilling to accept responsibility.

This brief discussion of the centralization-decentralization theme does not by any means exhaust the question. There is, for example, the need to ensure minimal physical and other coordination of the projects of contiguous jurisdictions—to make sure that the roads join, that drainage schemes do not conflict with each other and so on. Moreover, the particular organizational pattern that has been suggested probably would not suffice for all the elements of the public works program that any country would want to take up. Not all projects would be "localized;" some necessarily would be regional and/or national in scope, design and administration. Some governments, rather than relying so heavily on a program built deeply into the local institutional structure, might be interested in pursuing experiments of the type of the land army, youth corps or national conservation corps.

Public Works and Spatial Strategy

Every national development effort involves some geographical redeployment of activities and of settlements. Most development projects have inherent locational or spatial aspects: they help to connect particular activities or settlements; they situate individual plants, service and administrative facilities or other installations. While the spatial aspect is important to development, it by no means follows that conscious promotion of an explicit spatial strategy has been an inherent, or a prominent, aspect of most national development planning. In most countries the spatial dimension has not been perceived to be nearly so much a key dimension of development design as, say, inter-industry investment allocation or the consumption-savings balance or the foreign-exchange projection.

This laissez-faire attitude toward spatial strategy has been especially common with respect to what can be called the "centering" issue. The governments of most developing countries have recognized that, if they wish to modernize, their systems cannot remain as village-centered as they have been. The tiny frame of the average village of a traditional society cannot accommodate the infrastructure, input, consumer-supply and processing requirements of a modernizing agriculture nor can it offer an expansion of jobs outside of agriculture. There has been a tendency to assume, therefore, that centering patterns must shift to the opposite extreme and follow the path of uninhibited metropolitan agglomeration. Moreover, in the absence of an explicit, interventionist, spatial strategy, there has been a tendency for this assumption to be confirmed in many countries. Economic migrants out of agriculture become geographical migrants and, lacking cause or attractive opportunity to stop in between, they filter all the way through the smaller towns and provincial cities, gathering in vast pools of underemployment and urban misery in a few metropolitan agglomerations. The

sequence is self-perpetuating. As the largest centers grow, they develop positive "externalities" for the individual enterprises operating in them—advantages of access to trained manpower, capital, technology and industrial services on the supply side and, on the demand side, to ready markets—that accentuate their attractiveness to new industrial locations. The majority of the immigrants, however, cannot be absorbed in the progressive sectors of the metropolis.

Lately, in some developing countries, the social costs of undeterred metropolitan centering—the effects of congestion, pollution, the spreading "dual society" gap between the countryside and cities, and the other negative externalities that mostly accrue to the public and the consumer rather than to enterprise accounts—are being more widely perceived. Furthermore, in "green revolution" countries there is also an awareness of the desirability of guided, more dispersed centering. Such a pattern is needed not merely to forestall some of the excesses of metropolitan agglomeration; the productive performance of modernizing agriculture itself depends critically on the development of rural growth centers, above but near the village level. There is need for a wide disperson of centers which can supply farm inputs and services and process products—centers freed from the status structure of the traditional village, in which new rural opportunities and enterprises can cluster, and around which vitalized units of local government can form.

For both these sets of reasons then, there is a far livelier, more articulate interest in many countries now than ten years ago in the deliberate promotion of small (agriculture-serving) urban centers. But in most countries, little is being done yet to implement this. Many practical obstacles stand in the way, but one of the more powerful, certainly, has been lack of a budget—more particularly, a budget for public construction. For it takes more than governmental intent to build rural growth centers with enough speed and vigor to cause particular centers to take hold and become self-reinforcing. It requires much public investment in road networks, marketing, administrative, training and other facilities. It takes, in other words, a good deal of additive public works oriented to this purpose.

[Excerpted from "The Public Works Approach to Low-End Poverty Problems: The New Potentialities of an Old Answer," Journal of Development Planning. New York United Nations, Department of Economic and Social Affairs, No. 5, 1972, pp. 85-95, 99-112.]

# Rural Public Works in Morocco

Dudley Jackson and
H. A. Turner

[A rural public works program started in Morocco in 1961 has supplied jobs to some ten percent of the unemployed, largely in the poorest groups, with projects that have shown favorable benefit/cost results. Most criticisms of the program concern administrative aspects reflecting bureaucratic rather than economic shortcomings.]

In the field of social policy two important questions currently confront the developing economies. The first is: how can levels of employment be raised so as to mitigate the growing problem of unemployment and the poverty associated with it? The second is: do the constraints on employment consist mainly of limitations on the supplies of capital and labor, or are they concerned more with the demand for these factors of production? The answer to the first and practical question depends implicitly on the answer to the second, theoretical question; and one purpose of this article is to show why this is so.

For some time now, the standard theory of development in labor-surplus, or dual, economies has been roughly as follows. There is a sector of "traditional" agriculture using "primitive" methods of cultivation to produce foodstuffs for subsistence consumption. Against this, there is a sector of "modern" industry using "advanced" technology to produce consumer and capital goods. "Development" means transferring

Mr. Jackson is Research Officer, Department of Applied Economics, Cambridge University. Mr. Turner is Burton Professor of Industrial Relations, Cambridge University.

labor permanently from the agricultural sector, where its (marginal) productivity is low, to the industrial sector, where its (marginal) productivity is high. The critical constraint on this process of development is therefore the supply of capital in the form of machines and factories to the modern sector, and this supply, it is assumed, must be increased without limit and by all means possible. Most development plans have been based on such a model of development, and have raised taxes on income and expenditure or obtained foreign loans and foreign aid to supply the required capital, while imposing tariffs to guarantee markets for the output of the industries so created.

From the point of view of this two-sector/permanent-transfer model, the problem of unemployment seems insoluble, as a simple arithmetical model will show. If the modern sector provides 20 percent of total employment and if the total labor force and its productivity are each growing by two percent per annum, then merely to provide sufficient additional employment in the modern sector to avoid an increase in unemployment, the annual growth of output there would have to be 20 percent. So it is hardly surprising that development programs based primarily on industrialization have generally been insufficient to provide adequate new employment for the growing labor force. Furthermore, programs of that kind have often worsened social and regional inequalities within countries; while the relative neglect of agriculture has meant either a growing dependence on food imports or a falling standard of nutrition or both. Therefore, and belatedly, some resources have been diverted from urban industry to rural activities, usually with the aim of "raising the level of agricultural techniques." Typically, agriculture is to be "modernized" through a package of investment in large-scale irrigation and mechanized cultivation with fertilizers, pesticides and improved high-yielding plant varieties. Not surprisingly, these types of rural development programs also tend to run into constraints on the supply of capital, and have in general not materially affected the unemployment situation. If the unemployment crisis facing the third world is to be dealt with, these "capital-supply-constrained" processes of development will have to be supplemented by methods of development which directly tackle the "demand constraint" on the employment of labor itself. The purpose of this article is to analyze the problem of providing rural employment. We begin with an account of how the level of demand for labor is being increased in rural Morocco.

## The Moroccan "Promotion Nationale"

The Promotion Nationale (PN) program was started in Morocco in 1961 to employ "rural underemployed labor for improving and developing the underprivileged areas of the Kingdom. In view of the

scarcity of both capital and senior grades [administrative and skilled workers], Promotion Nationale confined itself to work which was technically simple, requiring abundant labor but which would nevertheless improve output. . . ." Under the scheme, employment is provided on various types of projects in half-monthly units of 12-day work periods. Theoretically a worker is not supposed to be employed for two successive work periods so as to spread the work opportunities among the unemployed. The worker used to receive payment of 2 dirhams a day ($0.40) plus rations of 5 kilos of wheat a day (about the same value), all paid at the end of the fortnight; in the middle of 1970 the division of payment was changed to 2.40 dirhams a day ($0.48) and 4 kilos of wheat. The wheat was provided by the United States in the form of food aid, and the cash costs are born by the Moroccan Government.

Table 1 recapitulates the employment provided by PN in terms of man-years. The basic statistic for PN is the number of man-days worked, because all costs are reported in terms of this figure. By dividing the total of man-days worked each year by 288 (i.e. 12 days multiplied by the 24 half-monthly periods) we obtain a figure in terms of man-years which can most readily be related to the population and to the labor force. But this is only an artificial construct: because of the rules rationing employment, many more individuals than this will have received some work payment from PN.

TABLE 1. "PROMOTION NATIONALE": NUMBER OF MEN EMPLOYED [1] BY TYPE OF WORK
*(in thousands)*

| Year [3] | Agricultural development | | Infrastructure | Social overhead capital | | | Total [4] |
|---|---|---|---|---|---|---|---|
| | Soil improvement and afforestation | Irrigation | Roads, bridges and port works | Streets and cleaning | Housing | Community buildings | |
| 1961 | 7.3 | 7.5 | 25.1 | 7.3 | — | 0.9 | 48.2 |
| 1962 | 10.1 | 7.8 | 24.9 | 2.6 | 0.3 | 1.3 | 46.9 |
| 1964 | 11.8 | 15.9 | 9.1 | 4.7 | 1.1 | 2.4 | 45.1 |
| 1965 | 11.6 | 13.3 | 16.1 | 5.4 | 0.8 | 0.8 | 48.0 |
| 1966 | 9.3 | 17.9 | 37.4 | 7.6 | 7.6 | 0.8 | 80.6 |
| 1967 | 12.7 | 18.8 | 25.5 | 3.5 | 4.2 | 3.4 | 68.1 |
| 1968 | 16.1 | 23.9 | 19.2 | 5.4 | 1.4 | 2.6 | 68.6 |
| 1969 | 15.9 | 22.4 | 24.1 | 1.6 | 2.0 | 1.3 | 67.2 |
| 1970 | 22.0 | 14.0 | 27.3 | 1.0 | 4.6 | 3.7 | 72.6 |
| Average | 13.0 | 15.7 | 23.2 | 4.3 | 2.4 | 1.9 | 60.6 |

[1] Number of reported man-days worked divided by 288, the number of work-days in each year. [2] Data for 1963 are incomplete in the official records. [3] Rows may not add exactly to totals because of rounding errors.

Sources: Promotion Nationale: *Bilan 1961-1966*, for the years 1961 to 1965; thereafter each annual *Bilan*.

On average over the first ten years of the program, about 60,000 man-years of employment were created each year. Nearly half the

jobs were on work devoted to agricultural development, over a third on work providing and improving infrastructure, and the remaining one-sixth on work building social overhead capital.

In 1968 the total economically active population was reported as being 5,575,000 (of whom 3,830,000 were men). Thus, in that year, PN provided an annual employment equivalent of 1.2 percent of the total labor force. Estimates of the rate of unemployment (including underemployment) range between 10 and 20 percent of the labor force, so that PN can be said to have provided employment for between 12 and 6 percent of the unemployed. However, the benefit of PN is spread more widely than these figures suggest because of the rationing of the employment it provides. If we assume an average of five employment periods per man per year, then on average over one-quarter of a million individuals—perhaps half of all the unemployed men—will have received some payment from the PN program (about 120 dirhams—$12— in cash plus a similar amount in wheat, together equivalent to about one-quarter of the average GNP per head). Thus while the impact of PN is relatively small, it is certainly not negligible.

The type of work undertaken also covers a wide range of activities. Measures are taken against soil erosion by terracing along the contours of hills, and by planting terraces with fruit and nut trees. Afforestation is another form of soil protection. Fields and pastures are improved through the removal of stones and the provision of watering places, while irrigation works of small and medium scale feature prominently, especially in the drier desert areas. Wells and small dams are built, and along flood-courses flood walls are constructed. Under the heading of "infrastructure," tracks are constructed and improved, drains and ditches are dug, and small bridges and fords are built, while labor is also provided for port works. "Social overhead capital" includes surfacing of village streets, construction of pavements, cleaning rubbish dumps, and constructing houses, rural centers and agricultural buildings such as communal barns.

It will be seen that some of these investments are capable of quick-yielding marketable increases in agricultural production (irrigation in particular), some are long-term but no less important (the prevention of soil erosion), while others yield non-marketable benefits. Although it is preferable for resources to be concentrated on the first type of investment, because the increased expenditure flows created in the rural areas by the program are then less gradually matched in the markets by increased outputs, the other types also yield real benefits to the community. However, concrete measurement generally depends on marketable increases in output, and such measurements generally show that the profitability of PN

projects is quite high. On ten PN projects which were evaluated in a cost-benefit analysis, the unweighted average rate of return was 14 percent and the median rate of return was 9 percent. The returns to irrigation projects were generally above average. These rates of profit were, moreover, estimated using accounting conventions which tend to underestimate the social benefit of the output and to overestimate the social costs of the inputs. They therefore err on the low side. Another indication of the cost-effectiveness of PN is the fact that the breakdown of total costs into wage payments in cash on the one hand and the costs of materials, equipment and transport on the other shows a division of 80 percent to the former and 20 percent to the latter. In other words, the costs of materials, equipment and transport are only one-quarter of the cash wage bill. As the cash wage bill is about one-half of total remuneration, the non-labor costs are equivalent to only one-eighth of total labor payments, including wheat. Thus, judging by all the above figures, PN is certainly an economically worthwhile project.

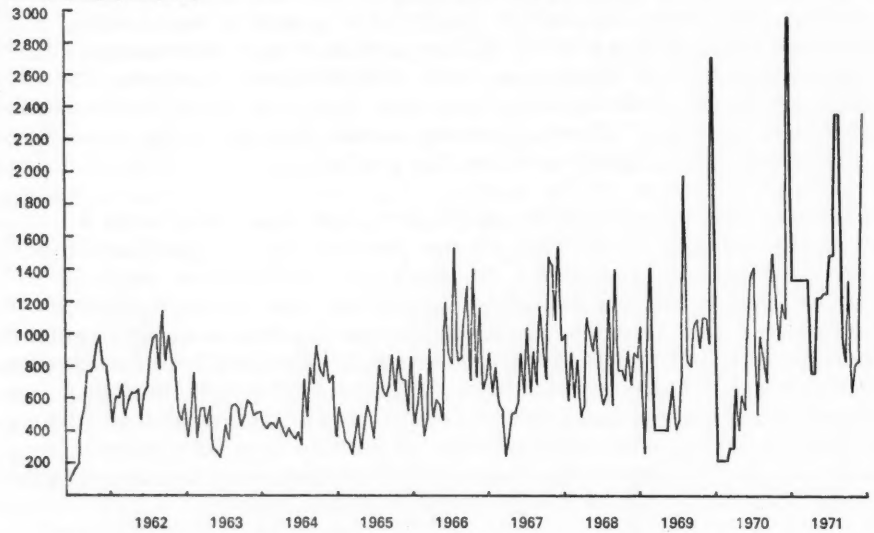
Not only has PN increased employment, but there has been a valuable redistribution of income to the poorer and larger families in the poorer areas of Morocco. On average, the poorer regions have received more than two-and-a-half times the number of man-days of work per rural active male than have the better-off regions. Thus, assuming that the regional incidence of taxation bears more heavily on more prosperous districts, there will have been a redistribution of income to the poorer (rural) areas. In a sample of married PN workers, the average size of family was 5.4 people, compared with the regional average of 4.3 people, and their average income was only half that of the average for the region.

Thus all the indications are that Promotion Nationale is economically and socially a valuable project. The difficulties that have been, and are being, encountered tend to be more administrative than economic. At present, the program is rigidly controlled by the central authorities, and local authorities are allowed no flexibility in changing projects during the year to meet changing circumstances. Diagram 1 provides, in graph form, some of the basic data on the fluctuating workload over the year, showing the division of the year into half-monthly work periods. Taking the years 1961 to 1968, the average amount of work provided in any one work period was 663,000 man-days, and in any one year the "standard deviation" around that average was about 231,000 man-days. That is, the average fluctuation in the workload was about 35 percent of the average workload. These fluctuations were largely related to the need for PN to provide employment inversely to the demands of agriculture, and so they demonstrate that the flexibility necessary in a rural public works program was on the whole maintained. But in the more recent years of the project there have been signs that, particularly towards the

end of the year, the fluctuations are becoming unduly large, and this reflects an administrative insistence that money allocated be spent before the end of the fiscal year. Conversely, at the beginning of the year, expenditures have been much lower than was previously normal because of delays in the approval of local programs. These signs of growing administrative strains are all the more serious in view of the fact that PN has not been increasing in size, largely because a declining proportion of government revenue has been allocated to it.

DIAGRAM 1. " PROMOTION NATIONALE ": NUMBER OF MAN-DAYS WORKED

*(000's per fortnightly work period)*




Note: Only average data (per fortnight) are available for certain periods in 1969-71.

Some of the main criticisms of PN have not been economic but political and administrative. The political criticism of PN is that it amounts to the use of external aid to shore up the existing social order; this is why land reform is sometimes cited as a sine qua non for solving Morocco's problems. But changing the social system and instituting land reform would not by itself solve the unemployment problem, although it would probably facilitate a solution. Land reform only helps to solve the employment problem to the extent that there is unused land to which the existing system denies access, or that it permits more labor-intensive methods to be economically applied. In our opinion the problems of unemployment and rural poverty are too urgent for any attempt to alleviate them to be delayed until major social and institutional reforms can also be implemented. In any case, the consequences of PN might be quite other than those its left-wing critics suggest; it inevitably brings new ideas and influences into isolated areas and, particularly if the

rural workers begin to participate more in the allocation of projects, PN itself may become a vehicle for dynamic social change.

Detailed criticisms of the administration of PN are common, and this is a problem which needs careful attention. The complaints concern delay in the payment of wages and the weakness of the management of particular projects. However, as a close student of Moroccan administration has observed:

> As provincial and municipal administrations were initially charged with the administration of PN projects, it is not surprising to observe that problems of administration here reflected rather the deficiencies of Moroccan local administration than the shortcomings of the scheme as such. The newly elected municipal councils were not more associated with PN projects than they were with other municipal affairs.

The criticisms of PN's administration are thus part of a wider network of criticism of Moroccan central and local government; it is not so much a case of a "difficult" scheme within an effective bureaucracy as of management within an allegedly ineffective bureaucracy.

[ Excerpted from "How to Provide More Employment in a Labour-Surplus Economy," International Labor Review. Geneva: International Labor Office, Vol. 107, No. 4, April 1973, pp. 315-323. Copyright © 1973 by International Labor Office. ]

# Rural Works in Indian Development

V. S. Vyas

[ Rural development using surplus labor for building agricultural infrastructure can spread the benefits of such projects to small and medium-sized farms and increase farm employment through intensified farming made possible through irrigation and other improvements. India has launched several rural public works programs in recent years, but so far delays in project approval and weaknesses in project planning and local financing have threatened the success of the programs. ]

From available accounts, about 40 percent of the Indian population lives below the poverty line. The bulk of the poor are concentrated in the countryside. The urban poor are, in most of the cases, a spill-over of the rural poor. The poverty problem has to be tackled therefore essentially in the rural areas, and rural works are one way of tackling this poverty. However, before we examine the role of rural works and intensive agriculture in providing employment and income for the rural poor, it will be useful to outline the main features of agrarian organization as they impinge on the income and employment problem in India. The more prominent among these are: (1) For a large section of agriculturists, especially for the small and marginal farmers, the main problem is that of low incomes rather than lack of employment *per se*. (2) The income and employment opportunities in the relatively small "modern" agricultural sector, mostly in the irrigated and assured rainfall areas, is increasing. (3) The income and employment

Dr. Vyas is Professor of Economics,
Sardar Patel University, Vallabh
Vidyanagar, Gujarat, India.

opportunities in the relatively large traditional sector, mostly the dry areas, are declining as population grows. (4) The wages of hired agricultural labor are determined more by the general state of agricultural development in a region than by any other factor and, therefore, are directly linked with the affluence of agriculture. (5) With the imposition of landholding ceiling legislation, an agrarian structure identified with small and medium-sized farms has come to dominate many areas. This structure is labor-intensive and characterized by intensive use of family labor. It will reduce the underemployment and disguised unemployment of family labor, but on the other hand, it will adversely affect the employment of hired labor. (6) On relatively bigger holdings the peak season dependence on labor will be minimized with the help of mechanization. As a result of all these developments, agricultural incomes and employment opportunities will progressively decline in that part of agriculture outside the orbit of modernization.

While the growing number of rural proletariat and the shrinking opportunities of wage-paid employment in traditional agriculture present one side of the picture, the other side offers the possibilities of labor-intensive, high productivity agriculture resulting from the introduction of high-yielding varieties of seeds and other complementary inputs. An important feature of this new technology is that it can be used only in certain locations, particularly those with assured irrigation or adequate rainfall. However, the possibility of increased agricultural output is not limited to the application of new technology but also can come from the improvement of the agricultural infrastructure.

The provision of infrastructure in agriculture is analogous to the introduction of an improved technology in that it enables a firm to arrive at a lower cost curve. In the case of infrastructure this is achieved via the external economies opened to the firm. The basic difference between the economies generated by an improved farm technology and those by a program of improved infrastructure is that the former is specific to the farms where it is adopted while the advantages flowing from the latter are spread over the whole of the "command area." Thus, the small and marginal farmers might not benefit from a new technology if, for example, it involves a minimum land base as in the case of certain types of mechanization, or, in the case of the high-yielding varieties of seed, the need for larger investment. On the other hand, evidence is accumulating to suggest that the development of irrigation from public sources leads to reduction in the differences in the income-earning opportunities rather than widening them. Since a small and ill-equipped land base is the bane of the marginal farmer, any strengthening of the land base, assuming the availability of more (previously under-employed) labor on a per acre basis, puts him in a more advantageous

position. If other institutional supports, for example credit, are available on favorable terms, he can take advantage of the possibilities of further intensification of farming, and thereby virtually enlarge his land base.

There is also considerable evidence to suggest that the provision of infrastructure, particularly irrigation, is the foremost requirement for the development of agriculture in vast areas of India. Rural roads and power supply improvements are as important as water resource development. In India the states which have made significant progress in the creation of infrastructure, e. g., irrigation, roads and power supply, are also the states which have taken significant strides in agricultural production. At a micro-level, wherever careful studies have been made, they have shown in an unmistakable way the impact made by the social overhead capital on agricultural development in particular and rural development in general.

Apart from the strengthening of the land base which results from infrastructure improvement, the employment provided by the rural works program has strong secondary and tertiary effects. To start with, most of these activities are labor intensive or there is a choice to accomplish the same results in a more labor intensive rather than in a capital intensive way. It was estimated, on the basis of the experience of rural works projects completed during the Third Plan period, that Rs. 100 ($14) invested in a rural roads program could provide employment of 50 man-days; in minor irrigation—94 man-days; and in soil conservation—59 man-days.

An equally important effect of infrastructure building is the increase in employment in agriculture, once the agricultural base is strengthened. Irrigation permits a higher level of employment, more productive employment and greater flexibility in the use of productive resources, and what is true of irrigation is true in lesser degree of other measures to improve the agriculture base. Besides, the building of infrastructure of the types mentioned above generates larger agricultural surpluses without much time lag. This, by definition, will limit the inflationary impact of added employment and resultant higher purchasing power.

Lastly, the existence of these facilities coupled with surpluses generated in agriculture provide the basic conditions for the growth of the non-agricultural activities in the rural areas. Ludhiana in Punjab, Kaira in Gujarat, Sangli in Maharashtra and numerous other areas dispersed all over India, signify the role played by agricultural development in triggering non-agricultural development. Ultimately, the employment in the secondary and tertiary sectors will provide the solution to the problem of a growing rural work force. However,

the dimensions of secondary and tertiary activities needed to absorb the expanding labor force in the countryside are so large that they can be based only on the foundation of a progressive, surplus generating, primary sector. Any isolated and sporadic effort for industrialization cannot be of much avail.

The idea of using surplus labor for capital formation is not new. Indian planners have paid lip-service to the idea from the beginning; both the First Five Year Plan and the Second Five Year Plan made frequent references to the use of surplus labor for capital formation in rural areas. But it was only in the Third Five Year Plan that a concrete program known as the "rural works program" was launched. By the beginning of the Fourth Five Year Plan in 1969 it was recognized that in addition to the minor capital formation projects and famine relief programs of the Third Plan there was a need for programs to supplement current incomes of cultivators whose holdings were too small to provide gainful employment only by crop husbandry, and for the landless agricultural laborers in certain regions who remained unemployed for periods ranging between three and eight months. Special programs were launched to cater to their requirements. They included the Small Farmers Development Agencies (SFDA), the Marginal Farmers and Agricultural Laborers Agencies (MFAL), the Rural Works Program for Chronically Drought Affected Areas, now called the Drought Prone Areas Program (DPAP) and the Crash Scheme for Rural Employment (CSRE).

The former two programs, undertaken on a pilot basis for the Fourth Plan period, are designed to help the small and marginal farmers by assisting them in the procurement of inputs and credit, by enabling them to make the maximum productive use of their farm resources and, by supplementing their incomes by occupations like dairying, raising poultry or pigs, etc. Although most of the projects were begun only in 1971/72, certain problems have already come to light. There was a considerable time lag between the authorization and the actual establishment of the SFDA and MFAL agencies. There were also lags in staffing these two programs. For each of these projects, the funds provided by the central government were to be supplemented by state monies for providing administrative support and infrastructure facilities. Due to their limited resources the states have been unable to provide the requisite finances which, in turn, has adversely affected these programs.

The latter two programs are essentially employment oriented. The main objective of the Drought Prone Areas Program is to create permanent works which will mitigate the effects of drought when it occurs and at the same time provide employment to rural households. So far there is no evidence to suggest that these programs have fared better than the ad hoc famine relief programs of the earlier years.

The Crash Scheme for Rural Employment aims at providing employment for a period of ten months to one thousand unemployed persons in every district in the country. An outlay of Rs. 1.25 million has been sanctioned for each district (additional sums have been allotted to a few districts). The schemes proposed are essentially labor-intensive projects. It was originally envisaged that 20 percent of the outlay would be used for administrative arrangements and construction material requirements and 80 percent would be paid to labor as wages. The wage rate was to be fixed at Rs. 100 per month in all areas. Works of durable nature like minor irrigation, soil conservation, afforestation, land reclamation, flood protection, anti-water-logging measures, road construction, arrangements for drinking water and fish farming were to be undertaken under the program. In the year 1971/72, a sum of nearly Rs. 320 million was spent on this scheme and about 80.8 million man-days of employment is reported to have been created. But an uncritical acceptance of this latter figure is hardly warranted.

Problems that have arisen in the implementation of the program include the inability of the states to suggest schemes to provide continuous employment for a period of ten months in a year or to find works to employ 1,000 persons in a district. It was also found that the cost of material and equipment was much higher than had been projected for some programs, and the states were therefore permitted to spend up to 40-50 percent of the outlay on construction material and administrative costs. While the aim of the program was to develop the rural infrastructure, a few states undertook projects which were not only too small in size but which could hardly strengthen the infrastructure in the region concerned. With the multiplicity of small projects in a district, there was a danger of laxity in supervision over the execution of the works and also the risk that the money invested would prove wasteful. The employment generation of the schemes was not taken into consideration by a number of states. The CSRE program, as it stands at present, will require serious modification if it is not to go awry like the earlier works program of the Third Plan period. Indeed, none of the Fourth Plan programs mentioned can be regarded as a proven success at this point, but further efforts in this general direction are essential in India and it may be hoped that performance will improve with experience.

[An unpublished manuscript.]

# A Land Army Project in Karnataka, India

W. Graeme Donovan

[Under the most recent central government rural works program in India, numerous projects have been set up throughout the country. This paper contains a description and analysis of one such project, showing the irrigation and other works to be built and estimating the employment to be generated in agriculture by these rural works. (Note: Mysore state was renamed Karnataka in 1972.)]

In India rural public works have often been viewed as a method for bringing assistance and "relief" to localities stricken by such natural disasters as drought and flood. The creation of employment opportunities has been an important element in works programs, since natural disasters usually reduce or destroy agricultural activity for a season, drastically lowering both the output of cultivators and the amount of work available for hired agricultural laborers. Employment in rural works then becomes the medium through which relief funds are channelled from the central or state governments to the localities. As unemployment in rural areas has become increasingly acute and obvious even in normal seasons, rural works are now being used in non-disaster areas as employment-creating devices. The objectives of such works are to construct physical assets of an infrastructural nature by employing unskilled rural people in large working groups in the general region of their home villages. Ideally, this has the dual effect of providing immediate participation in economic

Mr. Donovan is a Research Assistant in the Department of Agricultural Economics, Cornell University, Ithaca, New York.

life for some of the most poverty-stricken persons of the society, and of increasing the productive capacity of the local economy.

The Crash Scheme for Rural Employment

A rural works program with a special organization to manage employment-generating projects had been established in India at the beginning of the Third Plan in 1961. This relatively modest program fell short of the planned investments, however, and new and considerably larger efforts to deal with rural poverty were initiated in the Fourth Plan. One of these special programs was the Crash Scheme for Rural Employment (CSRE). This scheme was introduced at the beginning of the 1971/72 financial year, and seems to have been one attempt to put into effect the "garibi hatao" (fight poverty) slogan with which Mrs. Gandhi's New Congress Party swept to power in early 1971. The Crash Scheme aims at providing employment for at least 1,000 persons for ten months of the year in every district of the country. A wage rate of up to Rs. 100 ($13.80) per month is allowed. Funds are provided by the central government to the states, and the method of allocation is illustrated by the figures for 1972/73:

| | |
|---|---|
| Wage cost per district per year: 1,000 x 10 x Rs. 100 | Rs. 1,000,000 ($138,000) |
| Add 25 percent for equipment and materials | Rs. 250,000 ($ 34,500) |
| Total expenditure per district per year | Rs. 1,250,000 ($172,500) |
| Total expenditure for whole country (355 districts) | Rs. 443,750,000 ($61,237,500) |

Since the government had set aside Rs. 500 million for the scheme, the balance remaining was then allocated to the seven most populous states in such a way that the allocation per head of population was equal in all seven states.

Some other rules laid down in the CSRE guidelines included the following: First, projects may relate to road-building, drainage and land reclamation, water and soil conservation, flood control, minor irrigation, forests, extra classrooms for primary schools, and special repairs (not maintenance) to existing assets to put them into operation. Second, no project can be taken up which is already included in the Fourth Plan of any of the states. Third, as far as possible, not more than one person should be employed from any one family, and preference should be given to persons least likely to find alternative employment. Fourth, projects must not be executed

by private contractors, but are to be administered by District Development Councils, Zila Parishads, District Collectors and the like. Fifth, state governments must designate an agency to be responsible for maintenance. Sixth, funds are to be released by the central government to the states in four installments per annum under a rather complex arrangement whereby states must report when two-thirds of each installment is spent in order to obtain the next release. This provision, along with the requirement that states furnish monthly, quarterly and half-yearly achievement reports, may slow the appropriation of funds or give rise to discontinuities in their flow.

Finally, projects are to be designed so that, in each district, the wage component in total expenditure for all projects is no lower than 70 percent of total expenditure. Allowance is made for proportionate expenditure on wages to differ among projects according to their nature, but there is a suggestion that 60 percent is as low as it is thought the wage component should be for any project. An important issue raised by this latter provision is that choice of the proportion of expenditure going to wages is simultaneously a choice about income distribution, construction technique and the durability of the asset constructed—at least it is a choice about the range of choices which will be considered in these three areas. The interactions involved here will need to be weighed carefully, and perhaps spelled out as separate policy decisions, instead of being left as implications of what appears on the surface to be an arbitrary selection of a percentage wage component.

## The Land Army Project in Karnataka

In the Fourth Plan (1969-74), public works of considerable scope were proposed for Karnataka state. Funding for afforestation, soil conservation, flood control, irrigation, road-building and rural electrification totaled Rs. 1.4 billion ($193 million) for the plan period under normal plan procedures. In addition, the Crash Scheme was allotted Rs. 47.5 million ($6.6 million) for the years 1971-1973. One half of these funds were to be spent on a new, experimental organization called the Land Army—a project unique to this state. This new body was established in February 1971, but the first works were not commenced until the August-October period, 1971. By September 1971 about eight projects were operational and by March 1972 these had increased to 16, with some of the original schemes having become more ambitious in scope. At least 11 districts of the 19 in the state have Land Army projects.

The Land Army has a centralized structure. At the state level overall control is vested in an Executive Committee, headed by a former army general, with representation at the secretarial level

from state departments of Development, Finance, Agriculture and Forestry, Public Works and Electricity, and Labor, together with several other senior officials from these departments. The organization itself is directed by a former army brigadier with a small headquarters staff in Bangalore consisting of an assistant director, project engineers and administrative assistants. In the field the group of workers on each project is termed a "task force" made up of bhu-sainiks ("land soldiers"). This is controlled by a Task Force Commander (TFC) who has one assistant TFC if there are less than 150 bhu-sainiks, two for between 150 and 200, and three if the task force numbers more than 200. (These are the ideal ratios: they are not always attained in practice.) The military flavor is continued by further dividing up the task forces into platoons of 50 (with platoon commanders selected from among laborers) and sections of 10. In this structure the key figures are proving to be the Director and the Task Force Commanders who carry a heavy load of work and responsibility.

Task Force leaders are drawn from both military and civilian ranks. While a few TFCs have been seconded (temporarily assigned) from the regular army, most have been recruited from among unemployed engineering graduates, either diploma or degree holding. In the original screening 60 were selected out of some 400 applicants, and after a short but rigorous training about 35-40 remained for appointment. TFCs earn the equivalent of about Rs. 450 ($62.10) per month (including the imputed value of food) and assistants about Rs. 300 ($41.40) per month.

For a particular project, workers are recruited from local villages by Land Army personnel, helped by local village leaders. Selection concentrates on the age group 18-25 years, though where large task forces have been required this age has been exceeded. The only formal requirement for selection is reasonable physical health. General guidelines of the CSRE apply, since the Land Army is using these funds. Laborers are paid Rs. 100 ($13.80) per month, though some variations have been tried. The Land Army has been strongly advocating the "camp" concept, i.e., the erection of temporary dwellings on a central site where the task force may be accommodated. It has not proved possible to implement this entirely, and usually a situation arises where some part of the task force lives in the camp and the rest commute daily from nearby villages. To provide an incentive for the camp, workers who stay there are paid Rs. 4 per day, from which Rs. 1.30 is extracted to pay for meals provided by Land Army cooks. Commuting laborers receive Rs. 3 per day, and must provide their own food. Wherever the nature of work permits, piece work rates are introduced, which is having the effect of speeding up work and making laborers willing to work longer hours to finish jobs earlier. Usually a certain volume

of work is assigned to a ten-person group, with a specified price, and group members keep one another working.

The Land Army Director would like to have all of the bhu-sainiks living in camps for a number of reasons. First, an improvement in the workers' nutritional standards is aimed for, and it is maintained that many bhu-sainiks have gained 8-15 kgs. in weight, even while doing hard manual work. Second, health care maintenance is facilitated by the camp approach. The weight of workers is checked regularly, and any health problems which arise are dealt with there. Third, the Director also believes in the value of a disciplined camp life. This includes parades, drills and physical exercises on a regular basis. Finally, it is intended that evening classes be given in certain trade skills, but these have not begun yet. The Director would also like to follow up later with mobile trade instruction teams visiting the villages, but it remains to be seen whether or not funds will be available for this activity. It is not yet clear, either, whether the government will eventually make provision for laborers to be signed up on a more permanent basis (up to three years, for example), a move which the Director sees as desirable.

In Gubbi Taluk of Tumkur District, about 60 miles northwest of Bangalore, a project of the Land Army which includes roads, irrigation tanks and afforestation provides a useful example to illustrate in more detail the approach being adopted.

The Land Army Alilusrirama Project. The project centers upon the village of Alilaghatta (population 2,400) which is about 14 miles from the town of Gubbi on a paved road constructed eight years ago. Project boundaries have expanded considerably since it was first sanctioned. The initial core of the project consisted of two inter-village roads (a total of eight miles), a 400-acre forestry plantation, and work on three tanks, one of which was new. (A "tank" is the name given to a small village reservoir or storage dam, impounding water to be used for irrigating crops, livestock drinking purposes, and so on.) Since then an additional six roads have been proposed, totalling 17.5 miles in length, and the expanded project will affect at least 18 villages within an area of approximately 45 square miles. The taluk (local area) which has this project almost at its center is a dry region characterized by single cropping agriculture with a sizable area of coconut and arecanut (a kind of palm nut) gardens. In 1970/71, for example, of a net area sown of 140,000 acres, only 525 acres (0.37 percent) were sown a second time.

Table 1 sets out the planned expenditures for the original core scheme, the additional road works proposed since the project began, and a new large irrigation tank at Hardagere, the village which is being linked to Alilaghatta by one of the all-weather roads. This

Hardagere tank is being constructed under the auspices of the Public Works Department (PWD) but we include it here, because it should have a considerable productive impact upon agriculture by adding to

TABLE 1: Details of Alilusrirama Project and Hardagere Tank

1. Original "core" project

| | Road 1 (3.5 miles) | Road 2 (4.5 miles) | Forest (400 acres) | Tank 1 (8 acres) | Tank 2 (10 acres) | Tank 3 (10 acres) |
|---|---|---|---|---|---|---|
| Number employed | 200 | 200 | 200 | 200 | 200 | 200 |
| Duration (months) | 2.5 | 4.0 | 3.0 | 0.5 | 0.5 | 0.5 |
| Man-days | 14,000 | 30,000 | 20,000 | 2,500 | 3,000 | 3,000 |
| Wages (Rs.) | 42,000 | 67,500 | 60,000 | 7,500 | 9,000 | 9,000 |
| Materials (Rs.) | 28,000 | 45,000 | 15,000 | 5,000 | 6,000 | 6,000 |
| Total (Rs.) | 70,000 | 112,500 | 75,000 | 12,500 | 15,000 | 15,000 |

Total outlay: Rs. 300,000; Total man-days: 52,500

2. Road proposals added since April 1973

| | Road 3 | Road 4 | Road 5 | Road 6 | Road 7 | Road 8 |
|---|---|---|---|---|---|---|
| Length (miles) | 2.0 | 2.5 | 3.0 | 2.0 | 3.0 | 5.0 |
| Total cost (Rs.) | 37,500 | 37,500 | 37,500 | no estimate yet | 45,000 | 75,000 |
| Man-days | 8,495 | 12,186 | 8,725 | 8,550 | 10,850 | 15,000 |

Total outlay: Rs. 232,500; Total man-days: 63,806

3. Proposed irrigation diversion channel

Total outlay: Rs. 300,000

4. Details of Hardagere Tank (PWD)

| | |
|---|---|
| Area of tank: | approximately 76 acres |
| Catchment area: | 6.5 square miles |
| Gross storage capacity: | 146.62 units* (38.6 million cubic feet) |
| Live storage capacity: | 132.66 units |
| Useable water: | 115.77 units (allowing for 10 percent percolation and evaporation losses) |
| Area to be irrigated: | approximately 600 acres |
| Total cost: | Rs. 464,000 |

*One unit is the volume of water which will cover one acre of land to a depth of 6 feet. For standard purposes, 1 unit=0.261 MCF (million cubic feet).

Sources: Land Army files
Public Works Department files
Interviews with government officers

irrigation potential, and it links in well with the Land Army works. In addition, a proposal is being investigated for diverting water

from a stream some distance to the north of Alilaghatta so that it flows into tanks around the village. This will be a major diversion channel, and up to Rs. 300,000 ($41,400) may be sought to cover its cost as a Land Army project. That proposal is unlikely to be taken up before the 1973/74 year at the earliest. In all, the Land Army is seeking sanction for Rs. 900,000 ($124,000) in expenditures on the Alilusrirama project. To this is added here the estimate for the PWD tank at Hardagere, namely Rs. 464,000 ($64,632).

The estimates suggested that approximately 72,500 days of employment would be generated on the first phase roads (October 1971 to March 1973), and 63,800 days on the second phase roads (April 1973 to March 1974). This employment is created by the first two expenditures of Rs. 300,000 each, noted above. These timings have been altered somewhat by the way funding has become available, and we shall discuss below the employment achievement up to August 1972.

A small sampling of the work force (5.6 percent) in August 1972 produced data that give an idea of the characteristics of laborers employed on the project.

1. The work force has not been confined to those in the age group 18-25 years, as originally intended by the Land Army, although 61 percent of the sample were in that age group. Expansion of the Alilusrirama task force has clearly necessitated accepting older workers, who made up 34.7 percent of the sample interviewed.

2. A little more than 65 percent of the sample had received no education and were illiterate. The proportion of rural males aged 15-24 in Karnataka as a whole who were illiterate was 57.4 percent in 1961 and is likely to have fallen to about 52 percent in 1971. Thus the project has drawn disproportionately from among workers with less education.

3. In the list of castes, Vokkaligas and Lingayats are the major cultivating groups of Karnataka, and 26 percent of the respondents said they belonged to these groups. The Kurubar, A.K. and A.D. groups, from which 43 percent of the sample workers came, are generally regarded as scheduled castes. For Gubbi Taluk, in the 1961 Census, scheduled castes made up only 14.8 percent of the population, so that once again the project seemed to be drawing workers relatively heavily from groups generally regarded as among the least privileged in society.

4. That a large proportion of the task force workers came from lower-income families seems indicated by the large number farming two acres of land or less (69.6 percent), the proportion having no

education (65.2 percent), the proportion giving house value of Rs. 500 ($69.00) or less (82.6 percent), and the estimated family income per capita of working members of families from which bhu-sainiks came (Rs. 273 or $37.77 per capita).

Effects of the Alilusrirama Project on workers. During the period December 1971 to August 1972, the works program has provided approximately 47,600 days of employment for local laborers, and seems likely to generate at least another 133,000 days (i.e. about 53,000 days per year) during the next two-and-a-half years if continued as planned. The Task Force Commander was able to provide estimates of seven villages of origin of some 490 of the enrolled workers. The total work force of these seven villages is recorded by the 1971 census as 2,687. That is, at least 18 percent of the workers in these villages have obtained some employment from the project, and the proportion may be higher to the extent that some dropped out to be replaced by others (at least 560 laborers had received some employment).

Data from the sample interviewed indicate that for them the average amount of work provided by the Land Army during the past year has been 101.4 days, or 38.8 percent of their average total work (of 262.3 days) obtained for the year. We do not know what amount of work these persons would have found in the absence of the Land Army project. Reports of Land Army field staff seem to indicate, however, that many workers freely return to agricultural activities when the need arises and there is a "pull" from their own farms. This suggests that had alternative agricultural employment been available it might have been taken up by the Land Army laborers, and that therefore all Land Army employment represents a net addition to normal employment for these workers. However, we must concede the possibility that some Land Army laborers have been unwilling to return for agricultural work and that their unavailability forced other persons out of idleness, such as family members.

The Alilaghatta Panchayat (village council) chairman remarked that one of the important effects of the project had been a significant drop in the crime level of the locality. A number of community members had been driven, by lack of employment and attendant poverty, to surviving by petty thefts of food, crops and so on. Such incidents had virtually ceased since a large group of workers had been receiving regular incomes. This observation provides circumstantial evidence that effects of the project are reaching to poorer persons in the community.

It is very important, however, to ask what will happen to the workers when the Land Army project has been completed. In order

to maintain the currently heightened levels of expectation, the days of employment from the Land Army will have to be replaced by a considerable amount of additional employment, most of which will have to come from the immediate locality, and particularly from agricultural activities there. This means that the works should stimulate agricultural employment opportunities. Furthermore, the timing of this employment boost could be crucial. Ideally an expansion in the agricultural sector should be already under way before the project works end, so that there is no major break in the employment continuum.

Irrigation effects of the project. If the Land Army project is considered by itself (without the PWD tank at Hardagere), the irrigation effect will not be large. Work being performed on the three tanks is mainly in the nature of restoration and deferred maintenance which would otherwise have to be carried out by cultivators themselves. Two of the tanks are intended for use mainly for livestock drinking water rather than for increasing crop production. If the diversion proposed for the 1973/74 year is carried out, water supply in the Alilaghatta tank will be improved in the sense that the summer supply will be assured. Currently about 90 acres are watered by this tank, 60 acres of which are in arecanut gardens and the balance in wetland crops taken in summer if the tank is full. When the water situation is adequate at the beginning of summer, it means that the areca gardens can be watered once a month to a depth of six inches, and also that water is available for the other crops, notably rice, for four months. If the tank level is low at the beginning of summer, the arecanut trees receive priority, and no other irrigated crops are sown. (Arecanut trees are susceptible to drought during the summer, and will apparently die if deprived of water for more than three months.) It was maintained that under present conditions it is possible to grow the full supply of irrigated crops only once in eight years, although this probably exaggerates the lack of water. A supply of water via the diversion would presumably assure such cropping every year, though apparently there would still be no scope for double cropping.

If investment in the new PWD tank at Hardagere is included in the analysis, agricultural effects of the works program should increase considerably. The tank is expected to allow irrigation of about 600 acres of land now in "semi-dry" crops, and in good years double cropping will be possible, if a careful system of rationing is adopted to spread the water evenly over the entire area. About one-third of this area will be in Hardagere and two-thirds in neighboring villages.

[NOTE: The author makes a detailed estimate by acre of the probable crops to be grown after the new irrigation facilities are completed which is not reproduced here; interested readers should

consult the original. He does not attempt a money valuation of the additional output for cost/benefit purposes, but concentrates on the additional labor required by three possible production patterns. Alternative I retains the existing proportions of tree to non-tree crops, and posits chiefly an increase in rice to replace certain "inferior" coarse grains now grown mainly because of dry conditions which will be alleviated. Alternative II envisages a more thorough-going shift into rice from other annual crops, as would be rational, with tree crops as in I. Alternative III presupposes a larger shift into tree crops, more lucrative in the longer run but with lesser immediate output and lower labor requirements.]

The three cropping patterns may generate the following employment each year:

| | Total Labor | Employment for casual labor |
|---|---|---|
| Alternative I | 50,715 man-days | 44,253 man-days |
| Alternative II | 52,430 man-days | 42,795 man-days |
| Alternative III | 45,970 man-days | 41,336 man-days |

It is important to note the time difference between Alternative III and the other two. While the first two cropping patterns could come into being in the first year following completion of the irrigation works, the arecanuts would take 7-8 years to reach maturity and produce their full yield. The employment estimates for Alternative III therefore represent the "going concern" state of a later time. It is possible that the new agricultural employment opportunities may be sufficiently great at the peak time of the year to run right up against available labor supplies. We do not have data for employment patterns in the current agriculture which would allow this to be checked. The third cropping pattern is likely to contribute least to employment peak problems since it contains a mixture of ragi, rice and arecanuts whose peak labor requirements will arise at different times. The second alternative, by contrast, could exhibit "peakiness" in its labor requirements because it is so heavily oriented towards the one crop, rice. If labor peak problems do arise, it is likely that these will be at the beginning and end of the season when planting and harvesting operations determined by monsoon rain are under way.

This new employment which may be generated in agriculture, especially with the first two alternative cropping patterns, compares quite favorably with estimates of additional employment generated by total Land Army work during the construction phase of the Alilusrirama project— approximately 53,000 man-days per year. However, we cannot predict accurately who will obtain this additional employment generated in agriculture. It is unlikely that it will all be taken by casual hired laborers, as some of the cultivating families

would have "labor slack" which could become available once work opportunities present themselves. The crop operation most likely to be performed by either family or permanently hired labor is irrigation, because it requires only an hour or two on each irrigation day. If this operation alone were handled by family labor, the remaining employment open to casual laborers would be as shown above. The estimates of employment generation are most sensitive to changes in the labor coefficients for rice. A 20 percent variation either way in the rice coefficients would alter the estimates for Alternative I by nine percent, for Alternative II by 16 percent and for Alternative III by 7.9 percent. Varying the ragi labor coefficients by 20 percent would change the three alternatives by 9.3 percent, 2.3 percent and 5 percent respectively. Only the third alternative would be affected by varying the arecanut coefficient, a 20 percent change in the coefficient giving a 5.9 percent change in the total estimate.

Effects or roads. It is very difficult to quantify the impact of new roads on the village economies, and we have not been able to do the more extensive survey work needed to obtain data for such a quantification. In addition, analysis which concentrated on adding up the quantities of inputs and outputs which might flow over new roads could lead to a serious underestimation of the impact of the roads. The effects on village attitudes of daily passenger buses, or of more frequent visits by carrier trucks, government officials and by selling and buying agents from private firms and so on, may be profound. The direct production effects of the roads arise from the fact that they lower the costs of transporting inputs and outputs, or make physically possible the use of new inputs and appearance of new products not possible before. All-weather roads are essential for the marketing and distribution of certain perishable commodities such as milk, fruits and vegetables, and they make easier the larger scale spread of such bulky inputs as fertilizer.

| Species | Area (acres) | Uses | Years to Maturity |
|---|---|---|---|
| Glyricedia | 225 | Green manure (leaves) | 3 |
| Honge | 50 | Oil (seeds), Animal fodder (leaves), Fuel (branches) | 6 |
| Eucalyptus | 40 | Oil | 6 |
| Sandal | 25 | Oil or timber | 10 or more |
| Coconuts | 50 | Nuts | 10 |
| Tamarind | 10 | Fruit | 10 |
| | 400 | | |

Source: Information from Land Army Task Force Commander

The forest plantation effects. The main aims of this part of the Land Army project are said to be to prevent soil erosion and to increase soil moisture retention. There will, however, be commercial benefits from the forest, accruing from some of the species being planted. It is not clear to whom these benefits will accrue, but it seems that the village Panchayat will arrange for commercial exploitation for the benefit of the village as a whole. The make-up of the additions to the forest is approximately as indicated above.

It seems probable that only the coconuts and tamarind will be commercially exploited, and local estimates place gross profit levels of these two species at Rs. 2,000 and Rs. 6,000 per acre, respectively. Employment generation would be mainly from harvesting, and would not be forthcoming until maturity had been reached in about 10 years, too far into the future to help with alleviating immediate unemployment.

Expenditure effects. We noted above that in the seven villages from which most of the laborers were drawn to the Land Army project, it is possible to say that the project "construction effect" has been to give additional employment to about 18 percent of the work force, increasing their employment by a maximum of 63 percent and their incomes by 108 percent. This represents an increase in the overall spending power in the locality of less than 18 percent, since Land Army income is generally accruing to lower income members of the community. The additional income will be spent in a way which reflects demand patterns of the income groups to whom it accrues. To give some idea of the possible expenditure pattern, we have taken the total Land Army expenditure on wages, split it up among various income groups, and calculated the way in which this additional income might be allocated to various commodities, using data on consumption patterns developed at an all-India level.

Of the total projected Land Army expenditure of Rs. 900,000, we estimate approximately Rs. 555,000 will be spent on wages. If the sample of laborers interviewed was representative of the total work force, about Rs. 48,000 of these wages would be going to landless laborers, Rs. 97,000 to laborers with less than one acre of land, Rs. 362,000 to those with between one and five acres and Rs. 48,000 to those with more than five acres. From all-India data for 1964/65, Desai has computed the allocation of additional expenditure among a variety of commodities by various income groups. Using the proportions reported in his analysis we estimate that an additional Rs. 555,000 in expenditure might be allocated as follows: 62 percent on agricultural commodities, including 28 percent on foodgrains and 12 percent on milk products; and 38 percent on non-agricultural products like textiles, fuels, etc. A calculation such as this can be of some assistance in working out balances of commodities in an

area into which investment funds are to move. For example, if foodgrain prices average Rs. 750 per ton, then an additional 207 tons of foodgrains would be needed in the local area affected, during the period of time over which the above expenditure was to be made, if prices were to be kept stable. The expenditures are likely to take place over a three year period, so that stability of prices (at the level assumed) would require an additional quantity of foodgrains over that period equal to almost 11 percent of present annual production. Total output of the new land assumed to be in foodgrains in the Hardagere tank area would vary from 192 tons to 300 tons depending upon the cropping alternative adopted (these figures must be regarded only as illustrative). Similar calculations based on more precise data for different areas could usefully be attempted at a national level for an aggregate works program.

## Conclusions

The Land Army approach shows considerable promise for handling rural works programs. It has already demonstrated a capacity to recruit laborers on a sizable scale, and to supervise effectively the construction of such assets as roads, dams and forests, handling well the difficult coordination and administration problems involved. The Land Army has a centralized structure, at least at the state level: as such, it is a step away from the concept of close involvement of local bodies at all stages of projects. It may be that the decentralized method is the most valuable one overall, if carried right through to local fund raising. Where funds come from the central government, a tendency toward a centralized administration of expenditures seems inevitable. But the way in which workers are organized in the Land Army may go some distance towards restoring valuable local effects lost by overall centralization. This refers particularly to recruiting directly in the area of the project, providing opportunities for local workers to fill intermediate-level supervisory positions in the task forces, and to the possibility for explicit, after-hours instruction and development of trade skills.

To date, the Land Army Director has managed to keep a relatively close administrative familiarity with all aspects of projects by spending a lot of time in the field, checking on engineering and logistical details, ensuring accounts and records are maintained, trying to become aware of problems in the early stages of their appearance, and so on. This personal approach depends on considerable administrative skill, particularly at the Director and Task Force Commander levels, and it has placed a heavy burden of work on these key positions but has also produced a rapid flow of "direction" within the organization.

At least in the first year of operation, the Land Army had not solved the problem of delays in project sanction. Some improvement

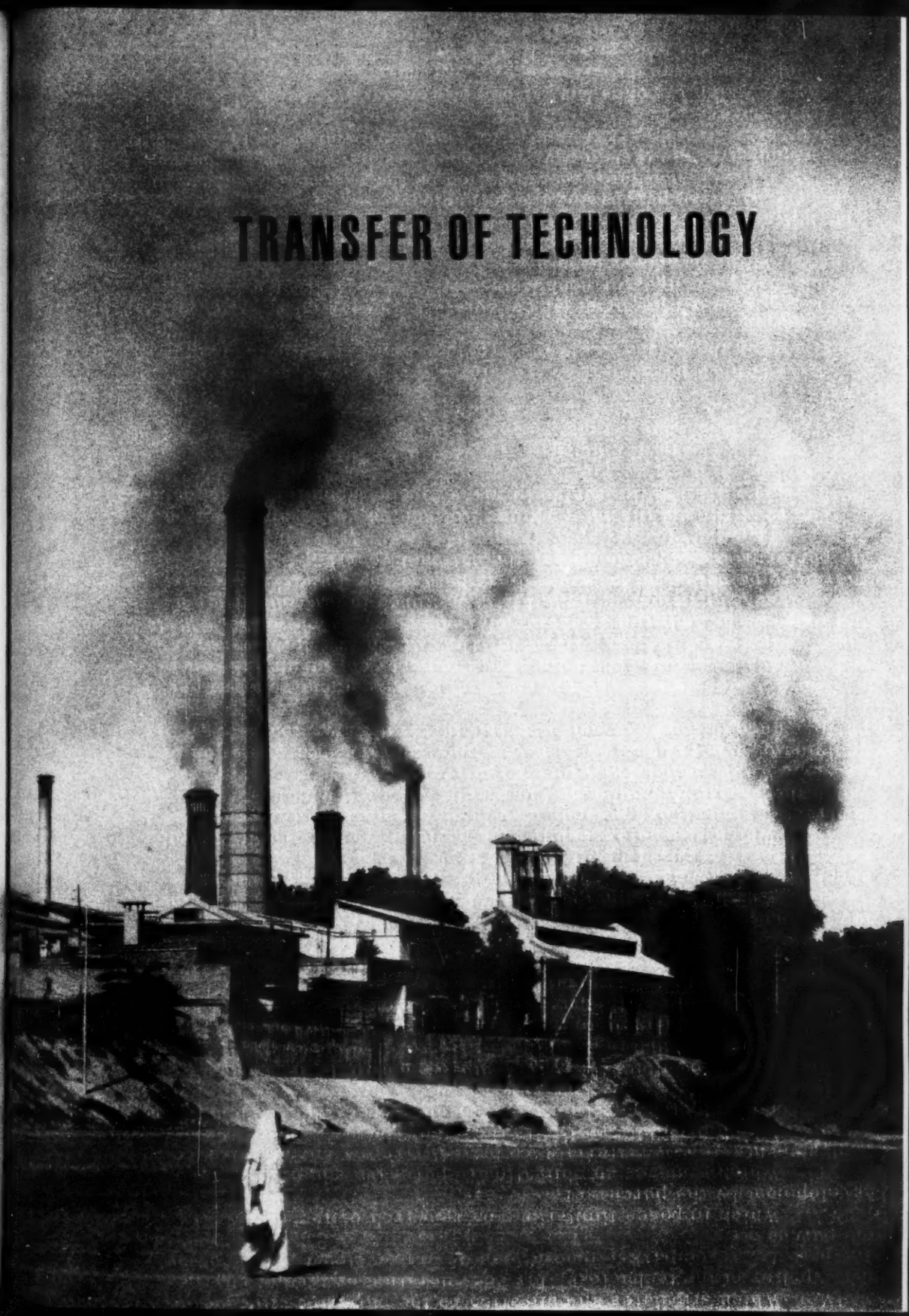
may result from moves to bring the function of technical sanction within the Land Army itself. Nor is it clear that the problem of repairs and maintenance which has bothered past rural works programs has been dealt with adequately. It seems likely that assets constructed by the Land Army will last longer than some which have been constructed in the past. However, no funds are being explicitly planned for maintenance under the CSRE. It may be necessary to set up specific compulsory levies at the local level to provide adequate maintenance funds, and a small work force, administered at the Block level, which would be permanently employed on maintenance work, moving from village to village throughout the Block.

Finally, the stimulation of post-project employment is a key concept in project selection. However, it is not sufficient to calculate additional labor requirements which will arise in agriculture, and compare them with those of project construction in such a way that a ratio of 1:1 between them becomes the criterion of success. A static criterion such as this is not adequate to deal with the dynamic situation of a steadily growing labor force seeking employment, nor with longer term employment effects. It may be argued that any gain in post-construction employment should be regarded as valuable, whether or not it reaches the level attained during construction. However, the 1:1 ratio may not be arbitrary from a political point of view, as the rising expectations of persons who find additional employment for three years and are then left out in the cold may turn to frustration and social unrest.

Focusing attention on immediate employment generation may obscure the real issues, which are raising rural real incomes and distributing these more equally. No account is taken of additional employment and income arising in local agriculture and industries as a result of development efforts quite outside the rural works project. The locality must be viewed in its totality in order that rural works may successfully mesh with other efforts. In the longer term, employment must be found in local agriculture and industries, but rural works may be a good way to set in train employment-creating sequences of change in local areas.

[ Excerpted from "Rural Works and Employment: Description and Preliminary Analysis of a Land Army Project in Mysore State, India," Occasional Paper No. 60. Ithaca, New York: Employment and Income Distribution Project, Department of Agricultural Economics, Cornell University, April 1973, pp. 1, 7-18, 20-29, 33.]

# TRANSFER OF TECHNOLOGY



MODERN FACTORY IN A DEVELOPING COUNTRY
[ PHOTO: U. S. AGENCY FOR
INTERNATIONAL DEVELOPMENT]

# New Trends in Technological Transfer

Charles S. Dennison,
Harrison Brown and
Simon Teitel

[ Until recent years, transfer of Western technology has been a largely unquestioned objective of Third World development. Today, some aspects of this transfer are being questioned. This article is based on an interview by Ceres magazine with the three authors; questions put to them by the Ceres reporter are designated Q:. ]

Q: Mr. Dennison, you have spent much of your life looking at the kind of technology that private enterprise can take to the developing world. Out of that experience, what do you feel are the major mistakes that have been made?

Dennison: In our first big push for industrialization in the developing countries after World War II, we attempted literally to transplant what we had developed in the Western world, a mirror image of our own industrial-consumer society. In certain cases, that wasn't too inappropriate. In others, it ran almost directly counter to many of the basic needs of the country. Most of our technology was capital-intensive, designed specifically to avoid high costs

Mr. Dennison, an international consultant with extensive corporate experience, is a director of the Agricultural Development Council and trustee of the Overseas Development Council. Dr. Brown is Professor of Geochemistry at the California Institute of Technology. Dr. Teitel, an Argentine economist and engineer, is an adviser on industry, science and technology at the Inter-American Development Bank.

of labor. Secondly, instead of attempting to adapt products, we tended to move into markets with, for example, large automobiles, because the basic objectives of most corporations—proper from their point of view—is to obtain market coverage and to maintain their competitive position and a return for their shareholders. I think we have learned a great deal and there has been a marked shift in emphasis in development planning.

Q: Do you think a less capital-intensive technology is compatible with a system geared to answering the demands of shareholders in a profit incentive system?

Dennison: There's one important point to register here. Local industry is the largest employer and the largest investor in practically all developing countries. Multinational corporations play a marginal or complementary role. There is a limit to what they can do in throttling down to some of these situations. I think they are now conscious—but should be more conscious—of employment needs and the issue of distributive justice.

Teitel: Mr. Dennison is right about most of the industries in developing countries being local. From the point of view of employment and other aspects, multinational corporations are marginal. However, this is not true in industries where the availability of technical know-how is critical. In industries such as automobiles, petrochemicals, pharmaceuticals, etc., while there may be a spread of ownership as we work back to suppliers, the fields where technology has been transferred and adapted are still the realm of foreign industry. There is consequently a particular role that foreign enterprise will have to play, in conjunction with local governments and local industries, with respect to technological choice and adaptation.

Brown: It's important to recognize that machinery and equipment designed and manufactured in the United States or in Europe are designed within the framework of that environment in its totality, including the economic environment. But because of greatly differing conditions around the world, it's not always the best equipment in other environments. During the early days of Japan's industrialization, a great deal of textile equipment was imported from the United Kingdom. Instructions that came with the spinning wheel said: "Do not run faster than such and such a speed." When the Japanese asked why, the reply was "because the thread breaks too often." Well, the Japanese experimented. They ran it faster and faster, and since they didn't have to pay much for a girl to tie knots in the thread, it turned out that they were operating the spinning wheel at three times the rated speed, and making considerably greater profit than they would otherwise have made.

The real problem, it seems to me, is that we in the West are so totally unfamiliar with the difficulties assailing the developing world that we are not likely to devise new technologies for their solution. We all know what a lathe looks like in the United States or Europe, where labor in some cases might run to $15 an hour. But what would a lathe look like if you designed it specifically for a society where labor costs were $1 an hour, or for labor costs of 10 cents an hour? I suggest they are going to be dramatically different. Appropriate technology can best be designed through pooled efforts by people who know their own environment extremely well.

Teitel: Even among multinational corporations, there has been a great deal of product redesign under the pressure of different market needs, factor prices and the availability of engineers and technicians in a position to make changes required by local conditions. For example, a car in Argentina is much different from a car produced by the same manufacturer in the United States. It is smaller, yet more elaborate in certain respects. It usually doesn't have automatic transmission or power steering, but it does have a stronger suspension for rougher road conditions, and a great deal more handwork in trimmings and the upholstery. I would say a great deal of adaptation takes place in developing countries. Plants are scaled down. It is generally not true that there is no substitution of labor for capital inasmuch as it is possible. When I visited a fertilizer plant in Iran, there were about 450 workers where 170 would be enough in the United States or Europe. We are all familiar with ways by which government or private industry in our countries keep people at low marginal productivity in different types of employment. What is this if not a form of substitution of labor for capital, for social reasons?

Q: Is there a tendency in developing countries, when it is decided to modernize any given sector of agriculture or industry, to go to what is regarded as the pinnacle of technological achievement, to the United States or Western Europe, when actually there might have been an opportunity to adapt more appropriate technology from a neighboring country?

Teitel: First, I think that we have to make clear that while "appropriate technology" is a catch phrase, we are not sure what it means. By definition, developing countries are not capable of developing their own products and techniques of production. So they have to absorb a great deal of their technology from more advanced societies abroad. In so doing, it is contended, inappropriateness arises. Now what do people mean when they talk about this? It is argued that these technologies are generally more capital-intensive than is appropriate for the relative costs of labor and capital in such economies. Also, that developing countries tend to use exotic

materials not available domestically while at the same time not making use of ample supplies of other raw materials which are available domestically. They tend also to end up with designs which are complicated, which include too many controls difficult to operate, particularly in a society where skills for this are not available. Furthermore, technologies in advanced countries with large markets and abundant capital and skilled labor tend to result in large-size plants. In the developing countries the markets are not there and as a result there may be a great deal of unused capacity, so we have a surplus of capital in a society which is really short of capital.

Dennison: One of the aspects I would like to emphasize in this question of appropriate technology and employment is that there has been a gap, particularly in countries like India or Brazil, between the urban industrial complex and the comparatively stagnant rural economies. It has been difficult to get the two together. Now we're bringing new influence to the countryside through plant genetic improvements and fertilizers. There's a great deal to be done in the whole spectrum of things that occur between the farm and the city—for example, intermediate processing and dispersed smaller industries to create more market demand out in the countryside. After all, over 60 percent of the people in the world are employed basically in agriculture.

Brown: In the People's Republic of China there has apparently been a conscious effort to develop small-scale industries suitable for villages and small towns which enable a certain amount of self-sufficiency in rural areas. Something like 30 percent of all the chemical fertilizers, as I understand it, are produced in very small factories in the rural areas, the balance being produced in rather large factories in or near the urban centers. They make such things as processed foods, making use of the proximity of agricultural produce. They have factory repair stations where they make spare parts for tractors. It seems to me that what they are attempting to do makes a certain amount of sense. They are not putting all their eggs in the large-scale industry basket, and at the same time are reducing the tremendous flow of individuals from the countryside to the cities, which is a concomitant of increased agricultural productivity.

Q: Doesn't this lead to a question of incentives? There may be some countries which will attempt to follow the Chinese model, but others are likely to take a much less radical approach. What kind of incentives are needed to bring the so-called Green Revolution technology beyond large landowners to small-holders with a hectare or two?

Dennison: The first thing, obviously, is to have a price structure such that, if you attempt to demonstrate new technology, the peasant

can see there is a definite return. Next is the availability of these new inputs out where the small farmer is located. Farm credit has been one of the most elusive problems; it's proved to be a block in many countries of Asia, even though they've been talking about it for years. But where you do get that combination of prices, available inputs, and credit, farmers can respond to demonstration. That's your incentive, it seems to me.

Teitel: People don't talk about appropriate technology per se, or don't talk about the so-called miracle of China because they admire it per se, but basically because of the interest in employment and unemployment. The problem of the developing countries is structural unemployment; it is the apparent waste of unused resources. If we look at the relationship between employment and technical change, one sees that, for the sake of analysis, there are three different ways in which we can increase employment.

To increase output implies increased employment. At the higher level of output, even if you produce the same type of things and with the same methods, there will be more employment. To increase the rate of growth of output one has to, of course, invest and this has to do with increased savings and the division of income. This way of increasing employment implies no connection with technology since there would be no changes in the product mix or in the techniques of production.

A second way of going about this is to keep the same rate of growth, assuming that the savings rate is all that we can get without some drastic social and political upheaval, but to change the product mix. For example, if one has a transportation need, it does not follow necessarily that one has to have a means of individual transportation like cars in the United States. There are other ways, at levels of satisfaction which may be comparable or not, of solving a transportation need which, because of their implicit factor requirements, are less capital-intensive. Consequently, some people argue that developing countries should produce more bicycles and less cars, so that automatically they will have more employment because, comparatively speaking, more labor is used to produce bicycles than to produce cars. Changing the product mix, of course, is not that easy. It depends, in certain countries, on tastes or consumer satisfaction. One can also argue that there is not only domestic demand, there is foreign trade, which is a component of demand. Most developing countries are being asked to increase export of manufactures and, at the same time, to increase employment and productivity. To be able to compete in exports and to keep high levels of quality pose a restriction on us. Furthermore, the indirect employment effects must also be considered, and they may tilt the balance in favor of the more capital-intensive line of production.

Finally, we can leave untouched the level of output and also the product mix, and only change the ways we use to produce the same type of things at the same level of output. This is the so-called problem of choice of techniques or adaptation of technology. There are situations where we may have price distortion. We may have the possibility of using more labor-intensive techniques than at the present, but because labor and capital are not relatively valued as they should be (because of wage rates kept artificially high, subsidies on importation of capital goods, etc.), these techniques are not used; this produces a distortion in the allocation of resources. So the competitive solution for industry when it does not get any other signal than market prices is to use more capital-intensive techniques than warranted by real scarcities.

It is quite possible that in certain cases, if we put prices in proper perspective, we would get to the point where a technique is demanded but is not available. There is not a technique which reflects Indian wages, for example, to produce certain types of chemicals. So in that instance we have a legitimate case for new technology to be created from scratch. The question is who has the capacity to develop these new techniques, where are the institutions, and the funds, and the skills which will take care of this function whenever it is warranted?

Brown: I think it is important that we emphasize that when we talk about appropriate technology, technologies which are appropriate from the point of view of the skills required, or from the point of view of the resources available, or from the point of view of the employment problem, that we are talking about technologies which are simply out of the way of thought of engineers in the Western world. The entire focus of our engineers has been on raising production per hour of labor by increasing the capital intensiveness of the design. This has almost always been accompanied by increases in scale, that is, the larger the unit, the less expense per unit of output. Our engineers simply are not used to thinking in terms of designing a small plant.

It would be interesting to pool together, let us say, a mixed group of first-class Western engineers, with Indian engineers who know their own country and its problems, and to establish in India a joint research and development institute aimed at designing small technologies for rural development.

Q: A lot of money has been spent both through bilateral agencies and through the UN system, the World Bank and so forth, helping to develop educational institutions in the developing countries. Has a good job been done in developing recognition of what technology is

needed in local terms, or have we simply modelled these educational institutions on Western style?

Teitel: I am not sure that the Western technology or the Western style of education is wrong. What I am sure of is that the way to develop the qualities needed is not telling people in developing countries what to do. The way is letting them develop their skills, use their brains, and "do their own thing" according to their own conditions, while giving them the aid that may be necessary.

Dennison: For the last 18 years the Agricultural Development Council has been working with Asian universities and research institutes with the prime objective of raising the number of trained people, basically in agriculture, in the rural areas. Now what they did was to use the base of the American university experience—the land grant colleges, Cornell, Purdue, etc. —and in effect began to create the capability in the various universities out there by providing scholarships, and by providing an on-going program so that the student who took his PhD. here could go back and then would have a continuing relationship, being brought up to date on all developments. They began to arrange seminars and interchanges. We posted top-level professors, one in each country, who brought the latest techniques and were available to work with the university and research institutions. We have developed a cadre of people who are today in ministries of agriculture, private industry and research. There is a shift today: we don't bring people over for Master's degrees any more. The competence is there. There is an interplay between the various universities in Asia; they have their own conferences. So we have seen in two decades, a brief period in the history of development, a really marked change in capability and institutional strength. There is a long way to go, but that's a case where a logical evolution from our U. S. model has occurred and I think it's a very healthy one.

Teitel: I feel that by definition, and we have not always adhered to this definition, somebody doing technical assistance should work toward the abolishment of his job. I mean, he has proved that he has been successful in that he is no longer required after a certain amount of time. That has not been true, generally speaking, for many experts. They tend to create their own self-perpetuating, bureaucratically justified needs.

Q: Have donor countries had too much influence in setting research priorities for programs which they have funded?

Teitel: We have little understanding so far about how to develop priorities for research and technological development. Among arguments for funding research there are several recurring themes.

Since the developing countries have certain very overwhelming needs derived from their poverty, massive needs of housing, health and nutrition, and things like that, it is assumed that research should go on there to solve these problems. One may have the need, but that does not necessarily indicate either the location or any comparative advantage in doing that work. Similarly with natural resources. Endowment with a given resource, and even a comparative advantage in its possession, do not necessarily imply a similar comparative advantage in doing research and development in furthering its utilization.

Q: How will environmental concerns affect the kinds of technology that the less developed countries may be seeking?

Dennison: The countries themselves do recognize the question of pollution caused by excesses in our own industrial system. They have simply said that there is also human pollution: poverty, squalor, lack of sanitation, malnutrition, etc., and I think we have to accept flatly that that is a priority, a legitimate one, and it has environmental implications. The developing countries have a real concern when they consider that some of the technology might become much more expensive and less appropriate, in some ways, for their own conditions.

There are opportunities, too. When you have an environmental limitation, many of the developed countries are going to have to look to foreign areas where they can create productive facilities and carriers that are closer to the raw materials. So this can be a very positive thing, a means of moving technology out to countries where they can upgrade their products. It's a mixed area of both certain harm and also a considerable amount of opportunity if properly handled.

Brown: Here in the United States very strict rules and regulations are being developed for the control of industrial pollution. In some states these controls are so severe that certain companies might have to close down, for the simple reason that the additional cost to them of pollution control no longer will make them competitive with foreign companies producing the same item. A serious situation in this respect concerns copper mines in Arizona being able to compete with Chilean copper, for example. Just how far this will carry us it's difficult to say, but rather clearly the developing countries themselves are going to be most reluctant to spend the amounts of money that are required to cut the pollution down to low levels.

Teitel: While industrial pollution is very important, I agree with some of the experts who claim that most of it can be cut down to

fairly acceptable limits at no extraordinary cost, and in a rather short period of time. I am more concerned, both in advanced countries and in less developed countries, with questions which have to do with the human type of pollution, questions of quality of life which deteriorates. I suggest that these are concerns which have to take priority.

Q: What are the future prospects for more consideration being given by those responsible for investing in economic development to human values, the social factors, the employment factors?

Dennison: The issues that Dr. Teitel talked about, quality of life, values, ethics, are up for examination in all societies. Part of this is caused by external pressures, consumerism, or by government agencies. It's also caused by younger people coming in with different values. Even at U. S. business schools students are changing their attitudes. The multinational corporations operating in another country are beginning to change. Simultaneously there is a marked change in the countries themselves. There are new, highly educated, very skilled officials. You find them in Indonesia, through Latin America, in Africa, and so on. They have their own conceptions of what is significant. They are reviewing their priorities and values. The country has to establish a climate in which it will tolerate investment. At the same time you find the companies, in effect, beginning to adapt. I think the process is not going rapidly enough, but a beginning has been made.

Teitel: The developing countries are increasingly concerned about having decision-making in their own hands. But it's not clear how you go about this and what are the costs and benefits associated, so the initial steps you may take may be just restrictions, and these may have some negative effects. I would say that decision-making and thinking in this light are becoming more sophisticated.

Brown: I know that my colleagues in many developing countries are doing a great deal of soul-searching concerning just what kind of a life style, what kind of values have to be taken into consideration in planning development programs. They have rushed toward the Western model and now they are beginning to have second thoughts about it.

[Excerpted from "The Fall of the Deus ex Machina," Ceres, The FAO Review. Rome: FAO, Vol. 6, No. 2, March-April 1973, pp. 34-39.]

# New Mexican Legislation on Technological Transfers

Miguel S. Wionczek

[Mexico has recently enacted a law that denies legal status to contracts by its nationals with foreign suppliers of technology if these contain costs deemed too high, exclusive supply provisions, restrictions on sale of products, and other features considered undesirable. The background to this legislation is described.]

A large number of studies on science and technology carried out recently in Latin America have led to some interesting conclusions, the most important of them being that one of the reasons for the Latin American lag in science and technology is to be found largely in the massive and indiscriminate importation from abroad of capital-technology-management packages, especially in manufacturing. Another reason is closely connected with the operation of the international and national laws on industrial property devised by and for the industrially advanced countries a century ago, which have continued in force with slight amendment since the signature of the Paris Convention (on patents) in 1883.

Some preliminary studies on what has happened in Argentina, Chile, Mexico and the Andean subregion have given rise to wide-ranging questioning about the impact of the traditional legislation concerning patents, the laws governing industrial property and the practices of licensing privately owned foreign technology, on developing economies in the Western Hemisphere. There is a definite connection between

Mr. Wionczek is Adviser at the Center for Latin American Monetary Studies, Mexico City.

the falling off—in relative terms, at least—of local invention and innovation and the growing concentration of research and development in the hands of the multinational corporations with their headquarters outside the region. One of the questions that has been raised and has not yet been satisfactorily settled—either in Latin America or in the advanced countries—is the effect of the transfer of technology through the licensing of patented know-how on: (a) consumption patterns in the recipient countries; (b) the selection of technology and its adaptation to local needs; (c) the use of imported inputs; (d) idle productive capacity; and (e) access to foreign markets.

The import substitution policies introduced in the postwar period have proven inadequate for the maximization of economic growth and social welfare in the Latin American countries. The latter are now in the process of working out new development strategies requiring the export of manufactured goods, an expansion of employment, and an improvement in the quality of human resources. Whether these aims can be attained depends largely on local scientific and technological capacity. Clashes between recipient countries and foreign investors are increasing in Latin America around the general problem of the nature and cost of future technological developments arising from the licensing of patented know-how. The increasing frequency of such clashes is one more cogent reason for trying to devise more independent and better conceived policies with respect to foreign investment, in both its traditional form and its modern form of capital-technology-management packages.

For the purpose of discussion at the international level, it may be best to put forward the following propositions—though they may seem somewhat unorthodox, they do reflect a growing consensus in Latin America. If the economically advanced countries agree that: (a) the less developed countries need an indigenous scientific and technological community to exploit the means of development that are potentially available, and (b) that the basic decisions regarding development must be taken by the developing countries themselves, then (c) the myth of the free flow of scientific and technological information must be discarded, and (d) the notion that the foreign capital-technology-management package is the best way to augment the developing countries' scientific and technological capacity must be dropped.

For sale only. It has been demonstrated that technology in most forms is not a free good but a commodity, like any other material asset. It is not transferred, but bought and sold. Moreover, it is the object of purchase and sale transactions on very imperfect market terms and in circumstances in which the independent buyer (in Latin America and other underdeveloped regions) is at a tremendous disadvantage, because he lacks information on other available

technologies. Our studies have shown that transactions involving technology, whether within multinational production units or between the owners of technology in the advanced countries and independent buyers in Latin America or involving technology incorporated in industrial equipment, are usually more profitable to the sellers than capital investment itself. It has been noticed too that almost none of the technology acquired abroad is properly adapted to local conditions. Lastly, the social utility of the technology imported is often open to very grave doubt, simply because Latin America cannot afford to imitate consumption patterns prevailing in high-income countries. To impose these patterns on Latin American societies is the surest way to general socio-political disaster.

It is no accident that Mexico is the first developing country to introduce fairly complete legislation to control the import of technology, known as the Act concerning the Registration of Transfer of Technology and the Use and Exploitation of Patents and Trademarks. As a developing country with a comparatively strong industrial structure, Mexico depends to a large extent on purchase of foreign technology. At present it is passing from the industrial development phase concentrating on the production of consumer goods to that of setting up industries producing capital goods based on ample access to the modern technology available throughout the world. There is an awareness, at the country's highest political levels, of the vital connection between economic development and the availability of technology. Experience in industrialized and in developing countries alike—Argentina, Brazil, the Andean Group and India in particular—was taken into consideration in drafting the new Act.

## Reasons for Concern

Concern about the impact of the cost of technology on the balance of payments arose in Mexico, as it probably did in other developing countries, some five years ago. Mexico, like all developing countries, has had problems with its balance of payments for many years. There came a time when the national experts engaged with these problems began to investigate the origin and destination of payments for the purchase of technology, including technical assistance, originating outside the country.

In 1969 they discovered that Mexico's payments to foreign countries for technology transfer, broken down to the level of the individual undertaking, amounted to about $100 million. They also discovered some rather curious and disturbing things. It could be shown, for instance, that the sector of the economy which was spending more than the others on alleged imports of technology and technical assistance was that of supermarkets. Regarding the destination of the cost in foreign exchange it was found that the

larger part went to such countries as the Bahamas, Liechtenstein and Panama. When the results of this investigation became known, people began to wonder whether these payments were actually for the purpose of technology or for something else—for instance, tax evasion.

It was found, too, that before the new Act, Mexico had been acquiring technology from abroad under the following circumstances: The machinery and equipment brought in with investment in subsidiaries of foreign corporations were in many cases obsolete, the result being low quality and high costs which made it harder to compete in foreign markets and was detrimental to domestic consumers. In other cases, the technology was far too modern for the requirements and characteristics of the domestic industrial plant, and this prevented the optimum exploitation of domestic production factors; generally, the machinery and equipment were capital-intensive and labor-saving. Restrictions were imposed on subsidiaries, and Mexican buyers who wished to export to third countries were required to purchase capital goods and inputs which were not always those best suited to the local industrial plant. There was interference with the production, marketing and management of the enterprise which purchased the technology; a very common practice was to include stipulations in the contract giving the seller powers to fix the prices of the products, limiting or preventing research by the recipient enterprise, forbidding the use of alternative technology, stipulating that the seller shall be the sole purchaser of the product, appointing the technical staff, collecting royalties for patents or trademarks which were not used and obliging the buyer to use patents or trademarks which did not involve technical advances, and acquiring the exclusive agency for sales in Mexico. It had been usual to stipulate in contracts for transfer of technology that any adaptations would become the property of the owner of the original technology—which prevented the creation of a domestic technology of its own.

## The Law

The Mexican Act is not intended to curb or hamper the import of foreign technology. As the statement of reasons attached to the Act makes clear, its purpose is to fit the purchase of technology to the country's requirements and to prevent abuses arising from a domestic enterprise's weak bargaining position, especially vis-à-vis the big international sellers of technology.

The act prescribes that the authorities shall not accept any instrument, agreement or contract concerning technology:

I. Whose purpose is to transfer a technology already freely available in the country, always provided that the same technology is in question.

II. In which the price or consideration bears no relation to the technology purchased or constitutes an unreasonable or excessive burden on the national economy.

III. Which includes the clauses whereby a regular supplier is permitted to intervene, directly or indirectly, in the management of the enterprise purchasing the technology.

IV. Which stipulates an obligation on the purchaser to cede to the supplier of the technology, for consideration or free of charge, any patents, trademarks, innovations or improvements obtained by the purchaser.

V. Which imposes limitations on research or technological development by the purchasers.

VI. Which imposes an obligation to purchase equipment, tools, replacements or raw materials exclusively from a specified source.

VII. Which prohibits or limits the export of the goods or services produced by the purchaser in a manner contrary to the national interest.

VIII. Which prohibits the use of supplementary technologies.

IX. Which stipulates an obligation to sell the goods produced by the purchaser exclusively to the supplier of the technology.

X. Which obliges the purchaser to employ as permanent staff persons specified by the supplier of the technology.

XI. Which limits the volume of production or imposes prices for the sale, resale or export of the goods produced by the purchaser in his country.

XII. Which obliges the purchaser to conclude contracts with the supplier of the technology for exclusive sales or agency within the national territory.

XIII. Which stipulates unduly long periods for the validity of such contracts, since these periods may in no case exceed ten years for which they shall be binding on the purchaser.

XIV. Which stipulates a foreign jurisdiction for the hearing or decision of proceedings which may arise from the interpretation or performance of the said instruments, agreements or contracts.

The Act also states that any contract or agreement concerning technology, including contracts or agreements concerning the licensing of patents and the use of trademarks, which are not entered in the National Register of Transfer of Technology owing to the restrictive clauses listed above, "shall have no force in law and may not therefore be relied on in proceedings before any authority nor may its performance be demanded in the national courts."

The requirements in the Mexican Act seems reasonable, not only to those who drafted it but also to many foreign suppliers of technology.

Some specific instances deserve mention here. An international seminar was held in Mexico City in November 1972 to discuss the scope of the Act as far as technology was concerned. One of the participants was the head of the United States section of the Licensing Executives' Society, a private international institute. He stated that he had not found any defect in the clauses of the Act, since they were an attempt to eliminate monopolistic practices and abuses which were already illegal in the United States and the European Economic Community. In December 1972, Mexico participated in a UNIDO meeting in Paris on transfer of technology in the automobile industry. Here, too, no opposition was expressed from any quarter during the three-day discussion with United States, United Kingdom and French sellers of technology. The same subject was discussed at Tokyo in early January 1973 with large Japanese industrialists, and here again they expressed no dissent. In short, the Mexican Act on the control of transfer of technology is not revolutionary or confiscatory legislation; it reflects a positive reaction by a country unwilling to be exploited as far as technology is concerned, an attempt to put matters right.

Mexico is not the only country that has embarked upon or is moving toward the regulation of technology transactions. Some developing countries, and some developed countries too, are realizing the need to establish some sort of control over international technology transactions. For example, Alastair Gillespie, the Minister for Industry and Trade, spoke in some detail to the Canadian Parliament on 10 January 1973 on a bill for the supervision of contracts relating to the licensing of technology negotiated between Canadian firms and foreign sellers.

[Excerpted from "Where Patents Go Through Customs," Ceres, The FAO Review. Rome: FAO, Vol. 6, No. 2, March-April 1973, pp. 23, 25-26.]

# Technological Choice in China

Shigeru Ishikawa

[ Choices of technology in The People's Republic of China have evolved through three phases, described below. The present policies are a mixture of elements, combined on the basis of past experience, which seem to be quite effective in serving the current purposes of the leadership but which will face certain difficulties as the evolution proceeds. ]

## The Phase of Soviet Model

The most important part of this phase was the period of the first Five-Year Plan (1953-57). The basic objective in technological choice in this phase was the establishment of an initial foundation of socialist industrialization in which the priority was put on investment in heavy industry. The central characteristics of the choice problem in this phase seem to have been that in spite of the maximum growth objectives, the scope for economic planning was limited narrowly to the state enterprise sector. In addition, the choice criteria actually applied in this sector were unrealistic. The narrow scope of economic planning seems to have resulted from an insufficiency of economic information and from the fact that standard tools of planning such as the "Synthetic National Economy Balance Tables" were not yet ready. Consequently, the planning procedure in the first plan was to assess the total amount of budget revenue which would be available and on this basis to decide how many capital construction projects it was possible to undertake. The impact of these projects on inter-sectoral relations and, more

Dr. Ishikawa is Director of the Institute of Economic Research at Hitotsubashi University, Tokyo.

generally, the relations between production, consumption and accumulation in the economy could not be evaluated at this stage.

As for the criteria of choice among the alternative technologies and techniques used in the construction projects in the state enterprise sector, they seem to have been determined and applied mainly by the Soviet advisers. This was certainly the case with the 156 industrial projects for which designs and equipment were supplied by the Soviet Union, and which were the basis of the first plan. While the specific criteria and the ways they were applied have not been made explicit, it is inferred that the principal criterion was the one which was used in corresponding industrial branches in Soviet Russia: the so-called "coefficient of investment effectiveness" or, its reverse, the "period of investment recoupment." This criterion is a useful one, though partial and involving some inconsistency. However, it seems likely that the actual coefficients used were similar to those used in Soviet Russia, and that the standard projects with which alternative designs were compared might well have been those used in Soviet planning. In this case, the choices which were actually made would have been unrealistic. As for the remaining area of the state enterprise sector, there is evidence that toward the end of the period certain industrial branches like water conservancy, electricity and shipping began to select between alternative projects by themselves using the "coefficient of investment effectiveness." The coefficients used, however, varied between projects and there were no common criteria even within branches as in Soviet Russia.

The industrial structure resulting from these investment decisions seems to have been very dualistic. First, the state enterprise sector, and especially those branches where there was Soviet assistance, came to be dominated by a relatively small number of enterprises and factories characterized by internationally up-to-date technologies, large-scale and capital- and skill-intensive. While these characteristics, together with the Soviet influence on the planning process, make it perhaps appropriate to call this the period of the Soviet model, it should be noted that altogether 74 percent of total net fixed-capital investment during the first Five-Year Plan was in the state enterprise sector whose aggregate output accounted for only 47 percent of national income in 1957, even after a tremendous increase during the first plan period of all-out socialization. As for technical knowledge and research and development (R & D) capacity, the concentration on the state sector seems to have been still more marked.

A comment is in order regarding the vast agricultural sector which was one of the non-priority sectors in this period. The Chinese government started to assess the age-old technologies and techniques in agriculture, aiming at their transformation. The

results were systematized into a particularly Chinese model only gradually and after a difficult process of trial and error, which continued until recently. In this period the planners attempted to increase food-grain production, relying simply on the existing technologies and resources in agriculture. A typical measure was the introduction of rice cultivation in northern China and of double cropping of rice along the Yangtze Valley after 1956. The former move was in general a failure; the latter attempt met sharply decreasing returns to labor.

As we shall show, this pattern of technical choice was drastically changed in the next phase. The change was partly motivated by a variety of imbalances in the national economy that emerged toward the end of this phase, e. g., shortages of raw materials and intermediate goods, especially in the iron and steel industry and in many branches of light industry; insufficient demand for products relative to productive capacity, as in the machine building industry, and unnecessary duplication of investments which resulted in under-utilization of the existing capacities. It may be also connected with long-term economic projections which seem to have been made by the planners toward the end of this period on the basis of economic statistics and survey results which were becoming available. These revealed the seriousness of the food supply and the labor absorption problems for the coming years.

The Phase of Great Leap Forward

In this phase, the Chinese planners took up the choice problem for the first time on their own account. The basic planning objective, however, seems to have been the same as in the previous period, i. e. maximum growth and development. The way in which the choice of techniques was made is often identified by the so-called "Walking on Two Legs" policy. As is well known, this policy led to investments in a great number of small enterprises equipped largely with native and traditional technologies in all branches of the economy and all over the country. More generally, the choice of techniques was multi-dimensional, and the underlying criteria seem to have been complex. To cite an example from the iron and steel industry, the actual choice resulted in at least three distinct technological patterns:

(i) large-scale projects using the most up-to-date technology. Construction of these projects was in fact continued from the first Five-Year Plan period with Soviet assistance;

(ii) medium-scale projects using modern but outmoded, i. e. non-traditional but out-dated technologies, with iron and steel-making capacities of less than one million tons; and

(iii) small-scale blast furnaces with an inner capacity which was usually less than 50 cubic meters and which were operated by native technology and techniques.

Moreover, both the small-scale blast furnaces and the medium-sized projects implied a policy of locational dispersion of the iron and steel industry in contrast to the original plan to concentrate it in a few large bases.

In order to study the choice criteria of this period, it seems important to understand the two different lines of thought on economic planning that had existed before the "Walking on Two Legs" policy was formalized between March and May 1958. The first might be called the technocrats' line. The main argument was that, under the existing conditions in China, the rational choice of technologies and techniques required a shift to less advanced ones and, hence, to smaller-sized and locally-based enterprises. The other was the party line or "mass line." It was considered that the people's initiatives, once aroused by the party leadership, could become an engine of growth. In this context, it was argued, even traditional technologies together with local resources could be fully and effectively utilized.

The development of the technocratic argument is worth a comment. Already in 1956, in the process of preparing a draft of the second Five-Year Plan, there appear to have been second thoughts on the use of internationally up-to-date, large-scale, capital- and skill-intensive technologies in the priority industries of the state sector. For example, a delegate at the National People's Representative Conference in 1956 proposed that in order to meet the increasing requirements for steel products in the near future, eight to ten medium-sized joint iron and steel mills each with steel-making capacity of about 700,000 tons should be built in addition to the large-scale projects. Calculations were presented which were based on criteria which resembled the "period of investment recoupment," but now the importance of shortening the construction period was stressed. In addition, it was mentioned that medium-scale mills could be built in localities where the quantity of iron ore was relatively small and which were near to the market.

The precise interpretation of the party line on technological choice is much more difficult. Broadly, however, the essential concern seems to have been maximization of growth by mechanisms through which the people (in particular, the families or family-based communities and organizations) could be aroused under the party leadership to initiate local investment projects principally with the means at their disposal—hence, with traditional technologies and with their own labor and local resources. This mechanism is

similar to what I call the "investment-inducement mechanism" of development in the traditional sector. The following points should be noted here.

(i) The basis of the investment-induced mechanism lies in the deep-rooted behavior of the families and the community in the subsistence economy, who allocate a certain proportion of their current labor and other investible resources to fixed capital formation so as to increase security and reduce uncertainty in maintaining the subsistence level of production.

(ii) This mechanism is likely to be brought into fuller operation by deliberate government actions such as providing subsidies to this kind of investment activity, or helping to introduce technological progress in production, or even simply enforcing organizational improvements. Through these government actions, the party leadership is exercised in a way which is in harmony with basic family behavior and thereby the construction of local investment projects is possible with minimum opportunity costs.

(iii) Once the needs of the family are satisfied to a certain level, and only on this condition, this pattern of behavior is likely to be transformed and to take into account broader social aims. It may then be called "public behavior" of the families and the community. The investment-inducement mechanism can continue in operation on the combined basis of the party leadership and the public behavior.

Theoretically, the technocrats' line and the party line are not necessarily irreconcilable. The pattern of harmonization of the two lines of argument seems to have been as follows:

(1) The economy was to be divided into two parts: the "central" economic sector and the "local" economic sector. The former covered those enterprises and networks whose productive and technical capacities would lay the foundations for future industrialization at an advanced level. The latter consisted of twenty-eight provincial economic regions (ultimately of seven economic regions), each of which should have a comprehensive industrial structure capable of substantial regional self-sufficiency. The local economic sector was also considered the principal sector where the investment inducement mechanism could be brought into operation. In this broad sectoral division, investment choices involved several stages:

(a) the investible resources under the direct control of the government (which we shall call the central funds) were allocated between the two sectors;

(b) in each sector the centralized funds were allocated between projects in accordance with a common criterion which still aimed

at maximizing growth but now within a shorter time horizon. In the local economic sector, however, this choice criterion included the investment-inducement mechanism as an integral component;

(c) the allocation of the central fund between the sectors was to be adjusted in such a way as to equalize the marginal productivities of the central funds in the respective sectors.

(2) In the central sector, application of this criterion was to be constrained by conditions such as industrial location, availability of technical knowledge, domestic capacity for supplying equipment and availability of foreign exchange. The results were expected to be an emphasis on generally smaller-scale projects and less advanced techniques than before, with the exception of the projects which were to be continued from the first plan.

(3) Investment choices in the local sector were complicated by the fact that this sector consists of industry and agriculture. Local industries ranged from mining and power, iron and steel, cement, chemical fertilizers, farm implements and machines to daily consumer necessities. These industries were to be connected with agriculture by various linkage mechanisms.

(a) The investment-inducement mechanism could be most easily applied in agriculture, where it would reduce optimal capital intensity. In order for the mechanism to be effective, however, technically efficient, labor-intensive techniques have to be brought into existence (by research and development)—and some of the materail inputs embodying these new techniques have to be made available to the people. This involved creation of new manufacturing capacity for these inputs. During the Great Leap Forward the technical choices in question were, in particular, between the major and minor works for irrigation, drainage and waterlogging, chemical fertilizers and farmyard manures, and between the various types of farm implements and machinery which might be modern (power-using), traditional but improved, or traditional in type. The choice of seeds and cropping system generally tended toward intermediate or semi-modern technology combined with the more intensified labor inputs and locally supplied equipment and materials.

(b) The investment-inducement mechanism could be brought into operation for construction of local industries, especially under the county or village governments, provided that the construction plan was formulated in close contact with the local masses and the plan was recognized by them as really useful for their immediate and ultimate welfare. The choice of technology and technique for local industry was necessarily labor-using and capital-saving. The technological level was also inferior.

As is well known, the Great Leap Forward was a failure. Among other things, the pattern of investments was not realized. However, there is still a problem of singling out how far the failure was due to the choice of technology; this is still hard to solve. The following points may be made at this stage. First, there appears to have been a big mistake in the actual choice of techniques, and this seems to have originated in the fact that the party line of thought concerning economic planning overwhelmed the technocrat line in August 1958. The balance between the two criteria was lost. One consequence was the neglect of technological restraints in local industries, resulting in the production of unusable products in many branches and costs of production which were often remarkably higher than market prices. Despite strenuous efforts to reduce costs by weeding out inferior factories they did not go down much, and this necessitated large and increasing government subsidies. Second, the choice of techniques in agricultural production was a failure at least in the sense that the expected availability of locally manufactured modern inputs was not realized. Third, the party leadership appears to have overestimated the extent of expected operation of "public behavior" on the part of the masses, even as far as sacrifices to the family. Hence, the investment-inducement mechanism ceased to work. Fourth, conflict between the two lines of thought seems also to have contributed to the Great Leap's failure, independently of technical choice. Natural disasters and their impact on overall economic conditions should also be taken into account. At the same time, however, it is worth noting that the choice pattern that emerged from policy decisions before August 1958 seems to have reappeared in the latest period in a broadly similar way.

## The Period of the Third and Fourth Five-Year Plans

It appears that in this period—from the early 1960s to date—the maximum growth and development objective continued to occupy the major place in the minds of the planners. Admittedly another objective has emerged, a kind of equity objective referred to as the elimination of the "Three Big Differentials." These are the differentials between mental and manual labors, between industry and agriculture, and between cities and rural areas. I would assume, however, that its relative weight in the objective function is small as yet. The functional and institutional division of the economy into sectors and sub-sectors and the choice criteria seem essentially similar to those which were contemplated in the early Great Leap phase. However, some of the conditions and constraints have undergone remarkably favorable changes and, partly because of changes in these conditions, the criteria of investment choice in each sector seem to be much more realistic now than they were in the earlier period.

These changed conditions include the following. There has been a marked advancement in the level of technology and technique in the modern manufacturing sector. The cutting of technical aid from the Soviet Union after 1959 and the importation of complete plants from the Western countries in 1964-67 have contributed to this. According to some Japanese technical experts, Chinese engineers are now capable of making independently the basic designs for steel plants, chemical plants, machine tools, construction machinery, mining machinery, power generation, distribution equipment and communication equipment to international standards. Also, in industries which are at the technological frontiers such as numerically controlled machine tools, computers, jet airplanes and petrochemical plants, they seem to have acquired already the theoretical foundation and are accumulating design data. They are still lagging behind, however, in techniques for materials production and the control of operations. Techniques for small-scale industries have also made considerable progress. This is particularly evidenced by the fact that the Chinese are now capable of manufacturing chemical fertilizers, small-scale tractors, diesel and electric motors and even iron and steel in smaller-sized local industries. In agriculture, in addition to the modern inputs which this industrial advance has made available, improved seeds, techniques of crop rotation and various irrigation and drainage methods, especially with the use of lift-pump sets, are available to the people's communes. Hence, the potential area of technical choice has been substantially widened as compared to the period of the Great Leap Forward. Correspondingly, the R & D capacity and the technical knowledge of the users seem to have increased. The increase in the R & D capacity also implies an increase in the capacity to absorb and adapt the most advanced foreign techniques.

On the other hand, the chronic state of under-employment of labor has not yet been improved fundamentally, while the state of food balance, though much nearer solution than the under-employment problem, continues to require considerable amounts of wheat imports and underlies the national policy to put a great effort into increasing agricultural production which began in the early 1960s.

Once again, lack of information prevents us from examining rigorously the choice criteria in this phase. However, various policy statements suggest an essential similarity to the criteria used in the period of the Great Leap Forward. It will suffice only to note some important differences.

With regard to the choice of investments in the central economic sector, it is now explicitly stated that modern large-scale enterprises are indispensable for accelerating socialist industrialization and that "critical" examination and discriminating introduction of

foreign technologies are necessary. It is also hinted that while a certain weight should be put on the construction of medium- and small-scale enterprises at the present stage, this will gradually change with the increased availability of investible resources. This change in the relative weight put on large-scale and medium- and small-scale enterprises with the increase in investible resources is a consequence of the procedure described above in the early Great Leap Forward phase. The constraints change with the passing of time: with increases in investible resources, especially in foreign exchange, the conditions which initially put severe limits on the use of central funds for large-scale, modern projects that might be more productive but are also lumpy, indivisible investments and foreign-exchange intensive, are alleviated. A further change is that there is now the possibility of introducing technologies from the advanced countries; this also seems to be novel to the planners. On the one hand, this raises a problem of allocation of the central funds between technology imports and indigenous R & D effort. On the other, it raises a more fundamental issue of how to balance the benefits from importing foreign technology against the costs of increasing export production. The Chinese policy on foreign trade has been strongly conditioned by a major emphasis on domestic equilibrium.

The units of regional economic self-reliance are, as before, the "Economic Cooperation Regions" or the provinces. However, the central effort toward regional self-sufficiency seems at least temporarily to have been directed to the county unit. In these units, the choice criteria seem now to include the investment-inducement mechanism explicitly only in agriculture and in the People's Commune industry. The party leadership plays a crucial role in the establishment of the industrial enterprises under the direct control of the county governments. This leadership is exercised at present mainly to initiate local industries within the means of the local governments and by mobilizing the cooperation of other local enterprises; the cases where the investment-inducement mechanism comes into play are apparently rare. This type of leadership seems to be different from the behavior that is often observed in a highly centralized system of government where an official's behavior is influenced by individualistic consideration of performance criteria or by the profit-loss calculation. In a sense, this kind of party leadership may substitute for the investment-inducement mechanism; we may call this the "leadership mechanism in local industry." It is a special mechanism which could not exist in a Soviet-type bureaucratic system, and it is an indispensable ingredient of the present system of organization of county industry. Investment decisions made in this system are likely of course to result in smaller-scale and less-advanced techniques with a higher local resource content than would otherwise be the case.

While the above sectoral division is clear-cut in principle, in practice some realistic modifications have to be made when necessary. For example, in the regions where there are large industrial cities, a complementary and cooperative relation is being promoted among the large-scale and the medium- and small-scale enterprises. The industries concerned are light industries, the textile industry and particularly the machine-building industry. The complementary relation is similar to the sub-contracting system in Western countries and is likely to become efficient once the scale of total output reaches a certain required minimum. In the agricultural machine-building industry, the establishment of a hierarchical network of provincial, county, People's Commune and Production Brigade factories or repair shops is encouraged. This also is likely to be efficient, especially if it accelerates the external effects of educating local labor forces.

The picture of the economy that emerges is broadly as follows: The major policy emphasis is on the development of the "local" economic sector, where the agricultural sector has begun to emerge as a dynamic factor primarily because of biological and hydrological innovations. These innovations have provoked a kind of mechanical innovation, mainly in the form of irrigation equipment, machinery for processing farm products and tractors. The leadership mechanism in local industry operates to determine requirements for modern inputs for these innovations and to initiate the manufacturing investments which are needed to produce them. The capacity and the output of local industry is thus expanding. This, in turn, feeds back and sets in motion the investment-inducement mechanism within the boundary of the People's Commune. In the central economic sector, large-scale projects using the most up-to-date technology are being undertaken in most of the important branches, though in relatively modest numbers and in a locationally dispersed way. Also, selective introduction of foreign technologies is being attempted. To elaborate:

(1) In agriculture, the basic factors which account for a significant amount of technological progress are the following: (a) the expanded spectrum of effective technological alternatives; (b) the increased capacity for supplying modern inputs from local industry; (c) government price policy, which has raised the procurement prices of many farm products and reduced the retail prices of modern inputs and daily necessities; (d) organizational reform of the People's Commune which has made the Production Teams (the smallest production units) the basic decision-making bodies in production, distribution and investment; the Production Brigades and People's Communes have become joint schemes linking together the Production Teams. This last change seems to have the effect of bringing the investment-inducement mechanism into fuller operation.

It also seems to provide an organizational apparatus that facilitates mechanical innovation, because the technical and financial economies of scale required for this kind of innovation can only be obtained by the Production Teams by organizing them into the joint schemes at the Commune level. The mechanical innovation now in vogue seems to be essentially labor-using. There remain problems. Factor (c) implies that resource flows between agriculture and industry are becoming unfavorable to industry; this may be permissible only as a transitional measure. Factor (d) is susceptible to political change, at least in the light of past experience.

(2) County industries now being established have a multi-layer structure with vertical linkages to both the local and central sectors. The fundamental element linking this structure together seems to be the party leadership mechanism. There is a report indicating that the county enterprises in "process" industries, such as metal and chemical industries are mostly running at losses, which tend to be covered by profits from enterprises in light industries. Considering the technologies used in the two industries such cost-price relations are understandable.

(3) In large-scale projects of the central economic sector (and probably in some of those under the provincial governments as well) there have been some remarkable achievements in technological catching-up. It seems, however, that the choice of technology is becoming an increasingly complicated task as the spectrum for the choice becomes wider. The choices involve two dimensions: the choice of the industries in which new technologies are to be introduced, and the choice of technology for each selected industry. The technologies in advanced countries in many important industries tend toward gigantic scales of production. In China, however, the weakness of transportation facilities, dispersion of mineral and power resources and some other technical factors necessitate scales of production which are smaller than in the advanced countries.

[ Excerpted from "A Note on the Choice of Technology in China," Journal of Development Studies. London: Frank Cass and Co. Ltd., Vol. IX, No. 1, October 1972, pp. 156-175. Copyright © 1972 by Frank Cass and Co. Ltd. ]

# International Transfer of Technology to India

V. N. Balasubramanyam

[Since independence, India has acquired most of its newer industrial technology through technical cooperation agreements with foreign firms rather than through direct foreign investments. Various aspects of such agreements are explored; shortcomings in this technology transfer mechanism result from the absence of an investment incentive for the foreign firms to make their technology work efficiently in India and from problems on the Indian side pointing to the need for a more discriminating search for the best importable techniques and for fostering of India's capacity for adaptive research.]

The literature on the economics of developing countries abounds in descriptions of the vicious circles and gaps that frustrate their development efforts. One ray of hope that shines through this general gloom is the contribution that modern technology can make: the availability of a pool of scientific and technical know-how, tested, tried, and perfected in the advanced countries, is seen as a distinct advantage that the less developed countries of today enjoy over those of the past. This promise that modern technology holds out for the less developed countries has led to a search for ways and means of transmitting it to them. Though various forms of technical assistance programs sponsored by public agencies are not lacking, it is the role of foreign direct investment as a transfer mechanism that has attracted wide attention.

Its role in the development process has been a subject of intense debate in recent years. The proponents envisage a multifaceted role for it, emphasizing

Dr. Balasubramanyam is a Lecturer at the University of Lancaster, England.

the part it can play in bridging the foreign exchange gap, the savings gap, and the technology gap that constrain development. Emphasis has shifted from the role that direct investment plays in transferring capital to the less developed countries to the contribution it makes in terms of the dissemination of valuable knowledge and/or enterpreneurship, in the form of research and development, production technology, marketing skills, and managerial enterprise. The critics point out that foreign ownership of capital may significantly affect the distribution of income in favor of the foreigners, impose a balance of payments burden on the host countries, result in a misallocation of resources, and adversely affect employment opportunities for the local population. A serious concern is the eventual foreign domination that may result from the relatively high profits earned by the foreign companies and the scope for extension of ownership and control of the economies that the reinvestment of such profits provides. There is also a third school of thought, whose adherents may be called strategic pragmatists. They advocate alternative arrangements such as joint business ventures, management contracts, and technical collaboration agreements, all of which have gained in popularity in recent years. The appeal of these arrangements lies in their ability to bring in foreign technology and managerial skills without the large-scale ownership of capital by foreign firms and the resulting foreign control over operations.

## Trends in Foreign Collaboration in India

Since independence, significant changes have occurred in the nature of foreign private business investment in India. Foreign capital and enterprise have been fanning out toward technologically intensive fields of manufacturing industry and away from the traditional strongholds of the plantations and extractive industries. The Indian economy has played host to almost all the diverse forms of foreign enterprise participation mentioned, most prominently joint business ventures and technical collaboration agreements.

Immediately after independence, fear of economic and political domination, founded on the colonial experience, was indicated by the initial hostility toward foreign capital expressed by private business interests and the political parties alike. However, the Government of India's 1949 policy statement on foreign capital, made by the prime minister, was relatively liberal. Existing foreign capital was to be treated on a par with national enterprises, mutually advantageous conditions for fresh inflows of capital were to be framed, repatriation of capital and remittances of profits were to be allowed, and compensation in the event of nationalization was assured. Majority ownership by foreigners was permissible for a limited period if it was in the national interest. Speedy Indianization of personnel was required, but the government would allow non-Indians in top positions if Indians of requisite skill were not available. This official welcome to foreign

capital did not find favor with domestic business interests in the early years of planning. But by the mid-1950s, as industrialization gathered momentum, the hostility of Indian businessmen towards foreign enterprise participation began to wane. The quotas and tariffs on imports imposed by the government to promote import substitution provided profitable sheltered markets for Indian enterprise. There grew the need for technical know-how and foreign exchange to finance the imported components and equipment required. Foreign enterprise participation was looked upon as a means of obtaining these scarce resources.

This change of heart on the part of private interests was accompanied by a stiffening in certain aspects of government policy. The evolution of policy in the 1950s and 1960s has involved an elaboration of generalized criteria for government approval of foreign collaborations, including the exclusion of foreigners from some industries, limitation on foreign ownership (to minority shares, with exceptions allowed) and on royalty payments (to five percent), and a requirement that the need for foreign inputs be established in each case by showing the value of the industry for Indian development, with emphasis on its contribution to exports. However, no rigid criteria are set for screening the applications for foreign collaboration. Each case is to be judged on its merits by the authorities.

Until recently a cumbersome procedure was in existence for screening the applications. Approval of foreign collaboration was a part of the general licensing procedures governing the setting up of new industries and the expansion of existing ones. The various ministries concerned with the industry to which the application pertains supply the Licensing Committee with the latest information on current production and licensed capacity in the industry, foreign exchange expenditure involved, plan priorities, etc. On the basis of this information the Licensing Committee makes recommendations to the government. If these are favorable, a letter of intent or license is issued to the applicant. If foreign collaboration is involved the letter of intent is only an indication that a license will be issued provided specific arrangements for the terms of collaboration and the financing of equipment imports are made to the satisfaction of the government, which means that the applicant has to go the round of the official bodies concerned with foreign collaboration once again. After the Director General of Technical Development and the Capital Goods Committee have approved imports of equipment and the applicant has made the needed financial arrangements, he obtains an import license. After these approvals and licenses have been obtained, the ministry concerned permits the collaboration and endorses a letter to the Reserve Bank of India for payment of the foreign exchange involved.

This lengthy description of the procedure shows what judging each case on its merits involves. Despite all this screening, it is not at all clear whether the authorities are able to apply any objective criterion in judging applications for collaboration. The elaborate critque by Bhagwati and Desai of the licensing procedures (in India: Planning for Industrialization. London: Oxford University Press, 1970) points to the inadequate and ill-organized nature of the information these agencies possessed, the absence of any objective criteria, the ad hoc manner in which the applications were judged, and the delays involved in screening. The ad hoc manner of granting licenses is illustrated by the policy of licensing projects on the principle of first-come-first-served, and of approving a project merely because it is able to finance the foreign exchange costs by foreign collaboration or export credits. The delays involved in approving applications have also been cited by more than one writer on the subject. It is to be noted, however, that the government set up a Foreign Investment Board in 1968 the primary aim of which is to speed up the disposal of applications for foreign collaboration.

The results of official policies are reflected in the trends in foreign private enterprise participation. First, foreign direct investment has shifted toward the manufacturing sector, and within that sector chemicals, metal products, machinery and tools, and transport equipment have gained in importance —in the sheltered markets provided by official policy. Second, fresh cash inflows of foreign private capital have been meager. Though the total value of outstanding foreign direct investments shows a substantial increase since 1948, 85-95 percent of this is accounted for in the years since 1955 by reinvested earnings and by non-cash inflows (i. e. shares allotted to foreigners in payment for equipment). Third, technical collaboration agreements have gained in importance.

A total of 3,557 foreign collaboration agreements were approved by the Government of India over the period 1948-70, only 366 of these in the years 1948-56. The number of pure technical collaboration agreements (which do not involve any foreign financial participation but provide payment for technical and managerial services in fees and in royalties based on sales of pertinent products) have been on the increase. A National Council of Applied Economic Research study sheds light on the 2,792 agreements approved in 1951-67. Nearly 85 percent of these agreements involved no foreign capital participation; only 80 agreements involved more than 50 percent foreign equity participation. This trend also appears in the rapid growth of royalties and fee payments from technical agreements, which by the 1960s had begun to exceed the flow of dividend payments in the foreign payments accounts.

Foreign interest in technical collaboration agreements. The government's policy of delimiting the spheres of operation for foreign capital and personnel no doubt influenced the trend just noted. However, the foreign firms may also have found technical collaboration agreements preferable to foreign direct investment in the Indian economy. Lack of adequate finance and knowledge about local markets and institutions may motivate a foreign firm's entering into a technical collaboration agreement in preference to risking its money. The need to cope with the complexities of Indian officialdom may be another important factor. A technical collaboration agreement may also serve as an exploratory device for foreign firms contemplating a closer financial involvement in the future.

Even more important is the scope for control over operations that a technical collaboration agreement offers. It is by controlling the operations of the local firms that the foreign firms can realize their motives of defensive investment—and the very fact that they held the reins over technology would in itself enable the foreign firms to exercise control over operations. The various restrictive clauses relating to production and sales of the products manufactured under license stipulated by the foreign firms provide another effective means of exercising such control. A Reserve Bank of India (RBI) report provides information on all types of restriction in 1,051 agreements in effect at the end of 1965. Some kinds of restrictive clauses are found in about half of these agreements. Total prohibition of exports appears in relatively few cases, but area restrictions, stipulating the countries to which Indian firms may or may not export, or requirements for permission to export, obtain in more than 40 percent of all agreements. Such export restrictions are a device by which the foreign firms attempt to guard the markets for their own products or to preserve their markets for technology. Provisions restricting the sources of supply for purchases by the Indian firms are found in about 15 percent of the agreements, most frequently in those for pure technical collaboration. The foreign firms thus obtained assured markets, and they may also have profited by charging relatively high prices for the components and equipment supplied by them to the Indian firms. In sum, the attractions of the technical collaboration agreement for the foreigner seem to have been the avoidance of localized problems and a sufficient level of profit without risk of capital, combined with a sufficient opportunity to obtain the kind of sales or supply source restrictions that mattered to them despite the lack of control based on ownership.

## What the Statistics do not Reveal

There are considerable data available on various aspects of technical collaboration agreements. But none of these statistics, alone or in combination, yield unequivocal conclusions as to the

nature and quality of the technology imported under these agreements, the problems associated with its utilization, or its contribution to growth in productivity. The author attempted to gather information on some of these problems by interviewing a sample of industrialists, and by a statistical analysis of productivity in a sampling of firms. (These findings are summarized by the editor in the following passages enclosed by brackets.)

[Interview Results. Managers of twenty Indian firms having foreign collaboration agreements were interviewed, with their anonymity preserved; they were all manufacturers of some type of machinery, chiefly non-electrical. The principal findings were:

1. Foreign technology was desired by these firms because appropriate Indian technology was thought non-existent or available only with uncertainties, while previously tested foreign techniques incorporating the latest developments could be put to use more quickly. It was not clear whether Indian technology had in fact been explored and found wanting, or automatically discounted. Foreign brand names were thought useful to many firms in promoting sales. Foreign financing was often helpful, but not a major factor in the decision to find a foreign collaborator.

2. Choice of a foreign partner usually resulted from past trading connections, sometimes from personal contacts with Indian executives. Only two companies had systematically surveyed the possibilities to choose the best one.

3. Firms that allowed their foreign partner a share in their equity reported much greater transfer of personnel than did those with purely technical collaboration. This results is similar to that of a wider survey of the subject by the Reserve Bank of India in 1968. Personnel transfer refers to the numbers of Indian employees given overseas training and of foreign experts sent to India, and to the duration of stay of both groups. Personnel transfer is important where imported technology is unfamiliar, complex, or otherwise demanding, and where the engineering or managerial capabilities of recipient firms could benefit from training and assistance.

4. Most firms imported 75-90 percent of their production components in the early stages of collaboration; after 5-7 years almost all had reduced this to low levels, many below 10 percent. Concerning the prices charged for these items by foreign collaborators, most executives indicated that they might be high but that this was part of the price of getting the technology they wanted.

5. The executives discussed various problems in adapting imported technology for use in India. Most said the foreign firms had

made no efforts to modify their technology to suit local needs; the few exceptions were firms having an equity in the Indian companies. However, modifications by the Indian firms were usually marginal; extensive adaptations of foreign methods were undertaken only by four large companies having their own research and development units — which most firms cannot afford.

Productivity comparisons. A sampling of 85 firms in four industries, in which some were foreign-owned subsidiaries, others had foreign technical collaboration agreements (TCAs) and still others had no foreign ties, served as the basis for comparing productivity in the three types of firms. The samples were limited by these requirements: firms used in intra-industry comparisons all made similar products; in the case of TCAs, only those firms who concluded such agreements in 1958-60 but had no further TCAs during 1961-65 were chosen. The productivity measures (all based on money, not physical, values) included: output per unit of labor; output per unit of capital (both fixed and total capital); total factor productivity (TFP) — output divided by a combined labor-cum-capital measure; gross profits as a percentage of total assets; in addition, capital intensity per unit of labor was noted. Table 1 supplies average values in these measures for each group of firms during 1960-65, along with more precise definitions of the measures (the original book gives sources of data, methodological discussion, and a far more ample presentation of results). In addition to the average figures in Table 1, the annual rates and directions of change in these measures in 1960-65 (not shown here) must be taken into account in judging overall efficiency.

1. There were three industries in which firms having no foreign ties (Indian firms) were compared with those having only technical collaboration agreements (TCA firms). a) In metal products, the Indian firms were more efficient by every measure and were improving their position relative to the TCA firms. b) In non-electrical machinery, Indian firms were more efficient by every measure but labor productivity, and were similarly improving their position. c) In chemicals, the groups were not far apart in their six-year averages, and the TCA firms were improving their relative position enough to indicate their superiority by most measures.

2. In two industries, TCA firms could be compared with predominantly foreign-owned firms. a) In chemicals, the foreign firms were more efficient in all measures, and were improving their relative position; this applies also to a comparison of foreign with Indian firms. b) In electrical machinery, the results are mixed. By six-year averages, the foreign firms were more efficient in capital productivity, profitability and TFP (narrowly), but not in labor productivity. However, the TCA firms were improving

their relative position in all respects, including labor productivity, so rapidly that they emerge as generally more efficient.

TABLE 1: Summary of Productivity Comparisons

(sample averages over six years, 1960-65)

| | 1. Labor Productivity | 2. Capital Productivity a. | 2. Capital Productivity b. | 3. TFP: Total Factor Productivity | 4. Gross Profitability (in %) | 5. Capital Intensity a. | 5. Capital Intensity b. |
|---|---|---|---|---|---|---|---|
| Non-Electrical Machinery | | | | | | | |
| 9 Indian Firms | 2.15 | 1.31 | 0.62 | 1.47 | 23.2 | 2.04 | 3.88 |
| 18 TCA Firms | 4.19 | 1.17 | 0.46 | 1.41 | 18.6 | 3.03 | 6.33 |
| Electrical Machinery | | | | | | | |
| 8 TCA Firms | 3.07 | 1.35 | 0.50 | 1.65 | 22.2 | 2.65 | 7.08 |
| 6 Foreign Firms | 2.63 | 2.26 | 0.62 | 1.71 | 25.1 | 1.58 | 4.63 |
| Metal Products | | | | | | | |
| 13 Indian Firms | 3.22 | 1.28 | 0.46 | 1.63 | 20.7 | 3.34 | 7.91 |
| 10 TCA Firms | 2.84 | 0.96 | 0.43 | 1.39 | 19.8 | 5.83 | 9.65 |
| Chemicals | | | | | | | |
| 6 Indian Firms | 3.27 | 1.17 | 0.52 | 1.70 | 25.4 | 5.33 | 8.32 |
| 6 TCA Firms | 3.90 | 1.24 | 0.44 | 1.63 | 21.6 | 8.61 | 12.60 |
| 9 Foreign Firms | 4.06 | 2.69 | 0.75 | 2.11 | 30.8 | 3.82 | 8.00 |

Measures: 1) Value added per unit of wages and salaries (V/W). 2) Value added per unit of: a.) fixed assets, b.) total assets ($V/A_1$ $V/A_2$). 3) See TFP formula below. 4) Gross profitability ($100P/A_2$). 5): a.) fixed assets per unit of wages and salaries ($A_1/W$), b.) total assets per unit of wages and salaries ($A_2/W$).

Symbols: V = value added by manufacture. W = wages and salaries $A_1$ = fixed assets (book value). $A_2$ = total assets. P = gross profits (includes depreciation).

$$TFP = \frac{V}{W + 12\%(A_2)^*}$$

*12 % is the assumed opportunity cost of capital based on the 1960-65 average net return of TCA firms.

3. In all intra-industry comparisons, the TCA firms were more capital intensive than other firms; the only qualification here is a possible future reversal vis-à-vis foreign firms in electrical machinery. This capital intensity largely explains why the TCA firms rated higher on labor productivity in all but one comparison. However, the relative weaknesses and the unfavorable trends that characterized many TCA firms in their capital productivity, TFP, and gross profitability are indicators of comparative inefficiency in the use of scarce resources. The main exception was in electrical machinery, where the TCA firms showed strong rates of increase in these measures.

General Implications

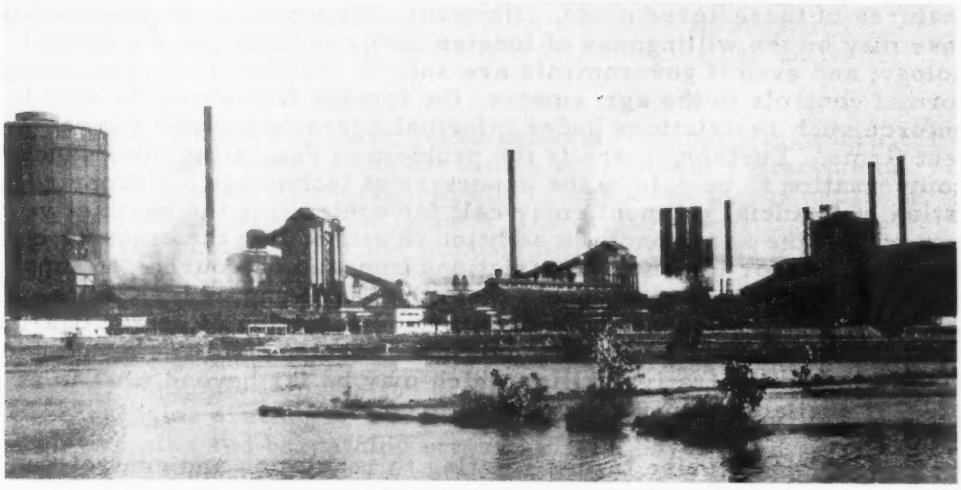
The key determining elements of a successful transfer of technology are the ability and willingness to transmit on the part of the transferor firms and the absorptive capacity of the recipient firms. The ability and will to transfer technology on the part of the foreign firms may be much less in the case of technical collaboration agreements than in the case of direct investment and joint ventures. The more intricate and complex the technology to be transferred, the less may be the suitability of technical collaboration agreements as a transfer mechanism. To the extent that engineering technology and managerial skills are inextricably interwoven, the effective functioning of the foreign firms may depend on their ability to operate as an integrated corporate entity. Technical collaboration agreements deny foreign firms the kind of total participation that results from capital ownership and control over operations. These agreements may therefore be suitable for transmitting knowledge that can be stored in drawings and blueprints or the kind that can be embodied in machinery and equipment, but not for complex technology requiring continuous and close participation by the transferor firms.

The willingness to transfer technology on the part of the foreign firms depends largely on the importance they attach to returns from the sale of knowledge and their stake in the failure or success of the ventures abroad. Unless the production and sale of knowledge is central to their activities, or technical collaboration is the only avenue open for participation in foreign markets, foreign firms may not attach much importance to the returns to be had from the sale of knowledge. These agreements may serve motives other than profitability, such as defensive investment and market probing, but these motives may not induce the foreign firms to evince a strong interest in the success of the ventures abroad. The foreign firms are also likely to be more concerned with the success of ventures in which their capital is at stake than of ventures where they have only a technical connection. Further, they may be wary of imparting knowledge to firms that may pose a prospective threat to their

market position. A direct investment venture involving the setting up of a subsidiary that would be subservient to the parent firm would be on an entirely different footing in all these respects. We have seen that the technical involvement of foreign firms was much higher in the case of joint ventures between Indian and foreign firms and technical collaboration agreements involving foreign minority capital participation, than in the case of pure technical collaboration agreements. Interfirm personnel transfers, the extent of intangible assets transferred, and the assistance rendered in the initial stages of operation were all reported to be higher in the case of joint ventures and technical collaboration agreements involving foreign capital participation.

Absorptive capacity. The capacity to absorb a borrowed technology depends largely on the indigenous research efforts and capabilities of the recipient firms, although the transferor firms may be of some assistance in this regard. In discussing absorptive capacity a distinction needs to be drawn between the recipient firms' capabilities to implement technologies that need no alteration, and their ability to restructure and adapt technologies to local conditions where necessary. The former calls for upgrading of managerial and labor skills at the plant level, whereas the latter is a long-range problem involving investment in research and development. In the first case the transferor firms may be able to assist recipient firms in the initial stages of the operations; they may provide training facilities for the managers and engineers of the recipient firms in their own plants, or assign their own personnel to the recipient firms' plants for a short period. Provision for such interfirm personnel transfers are to be found in many of the technical collaboration agreements. However, such personnel transfers were higher in ventures where the foreign firms had financial interest than in pure technical collaboration agreements. Managerial expertise being an expensive factor of production, foreign firms may not be willing to part with it unless they have a financial interest in the ventures abroad.

As to the problem of conversion and adaptation of imported know-how, our survey showed that foreign firms have been of little assistance in this respect save in exceptional cases where the foreign firms had a share in the equity of the recipient firm. Foreign assistance in restructuring was also reported by an Indian firm that was acting as a subcontractor to a foreign subsidiary operating in India. Foreign firms that have only technical connections with the firms abroad and regard sale of knowledge as only marginal to their other activities cannot be expected to evince any interest in restructuring the knowledge. When their equity capital is tied up in ventures abroad, however, the foreign firms may engage in research and development to innovate and restructure the technology to suit local conditions. In the absence of foreign help, it was only the larger Indian firms with technical collaboration agreements that had



The Tata Iron and Steel Company's plant at Jamshedpur, an outstanding example of Indian entrepreneurship. [Photo: Indian Information Office]

invested in research and development which had the capability to seriously restructure imported technology. If the presumption is always in favor of borrowing and adapting rather than straight borrowing of knowledge, technical collaboration agreements may be fruitful vehicles of transfer only in the case of large firms endowed with resources to undertake the adaptation.

Control and regulation. Theoretically, control that foreign firms can exercise over operation results from capital ownership. Technical collaboration agreements are by definition lacking in foreign capital ownership, and even in cases where foreign capital participation is involved it is usually in a minority—hence, the presumption that foreign firms cannot exercise effective control under technical collaboration agreements. However, this absence of control by the foreign firms may be more apparent than real. Effective control is defined to mean the ability of the foreign firms to influence the future course of operations of the recipient firms. The foreign firms may be able to achieve this by controlling the selection of sources of supply of materials and components, market outlets, production standards, etc. The restrictive clauses that foreign firms stipulate in the agreements, and the fact that they hold the reins over technology and can regulate its flow, provide them with the means to exercise effective control. In theory the governments of the knowledge-importing firms can regulate and keep in check the undesirable

features of these agreements. However, the more the regulation the less may be the willingness of foreign firms to transmit the technology; and even if governments are able to restrict the imposition of formal controls in the agreements, the foreign firms may be able to enforce such restrictions under informal agreements with the recipient firms. Further, there is the problem of regulating the financial compensation to be paid to the exporters of technology. Proper regulation of financial payments may call for controlling the restrictive features of the agreements in addition to controlling the amounts of royalty paid; for instance, restrictions imposed on sources of supply by the foreign firms may enable them to charge unduly high prices for the equipment and components supplied. Regulation of prices charged and terms and conditions specified by the foreign firms demands considerable administrative skills, which may be far beyond what is at present available to most developing countries.

It is precisely these issues relating to regulation and control that have caused most concern over Indo-foreign technical collaboration agreements. The main issues that have been debated are those relating to official policies, or the lack of them, for approving applications for collaboration made by the Indian firms and the ceilings imposed on royalties. The widespread resort to technical collaboration agreements since the late 1950s has led to the criticism that India may have not only imported too much technology but also purchased inefficient and inappropriate technologies. The available information is not sufficient to confirm or refute these criticisms, though there are grounds for suspecting that repetitive borrowing of technology and the purchase of inefficient technologies may have occurred.

The knotty problems of regulation posed by the very nature of the mechanism are further compounded by the kind of import and industrial licensing policies followed by the Government of India. As Bhagwati and Desai point out, Indian industrial and import policies may have prevented the competitive process from penalizing inefficient Indian firms, thus making inefficiency in the importation of technology both feasible and likely. While import controls eliminate competition from abroad, industrial licensing policies of the kind followed by the Indian government may have restricted competition from efficient domestic firms. The adoption of efficient policies designed to promote effective competition may not, however, entirely solve the problem. The competitive process might eliminate the feasibility of importing inefficient technologies — firms operating with inefficient technologies would lose out to the more efficient ones. However, the market for knowledge being highly imperfect, the likelihood of the firms importing inefficient technologies would still be there. If better technologies were available and if the firms possessed complete information about alternative streams of technology and sources

of supply, it is inconceivable that they would import inefficient technologies. But in the absence of such complete information the likelihood of firms importing inefficient technologies cannot be eliminated.

The absence of an objective set of criteria for approving technical collaboration agreements, and the Indian government's practice of judging each case on its merits, are to be explained by the nature of the market for knowledge. It is not a lack of awareness by policy-makers of the problem, but the impossibility of devising a uniform set of objective criteria in the face of the imperfections that characterize the market for knowledge that may have led them to opt for this practice. The market for technology is highly imperfect in the sense that the product being traded is not standardized, there is an absence of complete information about the relative merits of alternative technologies available, and there are substantial differences in the relative size and bargaining strength of the buyers and sellers of knowledge. Technology is a collective input with more than one resource involved. Even for a particular product there may be several streams of technology available involving different combinations of the resource mix that make up the package called technology. Lack of knowledge about the technologies to be bought is a major factor rendering the market for technology imperfect. Education and/or information is required to cognize, decode, compare, and negotiate for the acquisition of technologies. Thus the very nature of the market makes it difficult to devise a set of objective criteria that can be uniformly applied in judging applications for collaboration. Though it is difficult to formulate such guidelines, the need for regulation and control of the prices charged for technologies and the restrictions imposed by the foreign firms can hardly be denied.

However, effective regulation and control of the trade in knowledge requires comprehensive information on the part of the official agencies scrutinizing collaboration agreements and the private firms negotiating such agreements. This is an area where international agencies dealing with development problems and management and technical consultancy firms of advanced countries could be helpful. They can aid in the collection and dissemination of information about the various technologies and available sources of supply. Hans Singer and Salvatore Schiavo-Campo have, for instance, suggested the setting up of an international fund that would compensate the foreign patenters for any risk or sacrifice they may incur in bringing their innovations to the less developed countries. The Indian government may also think in terms of setting up a centralized agency in the form of a data bank, manned by experts from different industries, charged with collecting and disseminating information about the various sources and types of knowledge available. Such an agency could also arbitrate in the fixing of royalty rates; because of

the imperfections and lack of information in the market for knowledge, royalty payments should not be left to free-market forces. Although an arbitrary ceiling in terms of a set percentage may not be practicable, there is still a case for official scrutiny and regulation of the rates paid. But such intervention could be effective only if the official agencies possess adequate information and experience.

Assimilation. International transmission of technology to the less developed countries is a multifaceted problem. Apart from the problem of transference and regulation of the transfer mechanisms, there are problems associated with the assimilation and utilization of imported know-how by the recipient firms. Although data deficiencies precluded firm generalizations, the results of the exercise in interfirm efficiency comparisons for a selected sample of firms, reported above, suggested the following:

First, firms operating with imported know-how tend to be relatively capital-intensive in their operations. Though their high capital-intensity may be partly due to the capital-intensive nature of imported know-how, it is possible that they may have been compelled to substitute capital for labor in the absence of labor skills. Managerial inefficiency may also have contributed to such an outcome. Further, it was found that in the case of the chemical and electrical machinery industries the capital intensity of Indian firms operating with imported know-how was relatively high compared with that of foreign firms operating in India. The lower capital intensity of foreign firms may in part be due to their possessing superior managerial and labor skills.

Second, the production function analysis [ results not described here] showed that the firms operating with imported know-how were generally inefficient in the use of capital but had shown marked improvement in this respect over the six-year period analyzed. These results suggest the importance of "learning by doing" and the consequences of entrepreneurial immaturity in the early phase of technological borrowing.

Third, though firms operating with imported know-how had registered an increase in labor productivity, their performance in terms of overall efficiency was not encouraging. This result shows the interrelationship between labor productivity and capital intensity and reinforces the need for managerial and entrepreneurial know-how.

## Need for Adaptive Research and Application of Upgraded Skills

The foregoing summary highlights the problems associated with the international transmission of technology to the less developed

countries on an enterprise-to-enterprise basis. Technical collaboration agreements appear to offer limited scope for effective transmission of technical knowledge. First, the foreign firms may be less willing and able to transfer complex technologies under agreements that deny them financial participation. Second, such agreements do not provide for a sustained relationship between the transferor and transferee firms, which may be crucial for the successful implantation of technologies. Third, they pose problems of regulation and control that call for considerable administrative skills on the part of the less developed countries. Fourth, these agreements do not in general transmit the kind of managerial and labor skills needed to effectively utilize an imported technology.

The Indian experience illustrates these problems. Further, it emphasizes the need for upgrading managerial and labor skills and investment in research designed to promote the effective absorption of imported technologies. While individual firms may be able to invest in the education and training needed to improve their managerial and labor skills, investment in research may have to be a collective effort. Returns to scale are important in the field of research and development activity. Individual firms may neither be able to afford the resources nor perceive the returns to investment in research. That the social rate of return to research effort may be greater than the private rate of return is a familiar axiom. Individual firms looking at only the private rate of return to investment in research and development are not likely to invest substantially in such activity. Hence, indigenous research may have to be fostered by public assistance, and by cooperative activities on the part of private firms. The returns to investment in research activities designed to promote the adaptation and restructuring of imported technologies may be higher than the returns to investment in basic research.

Imitative innovation may be less expensive and more fruitful. It is in this sphere that the oft-quoted Japanese success in the field of technological borrowing offers the most fruitful lessons. The following example of the shipbuilding industry cited by The Economist illustrates the point: "They built the best foreign machinery under license and quickly applied the most advanced techniques with strong government support. . . . The Ship Research Institute is a part of the Ministry of Transport . . . . [S]hipbuilders have improved on many of the designs they previously built under license and now offer the rest of the world the highly effective result of their own original research." Indigenuous research effort can be an effective complement to imported technology if it is channeled in the direction of restructuring and adapting the imported know-how.

In the final analysis, the problem of transmitting technology to the less developed countries depends on the effective utilization of all the avenues open. Although technical collaboration agreements may not be an eminently suitable mechanism, they cannot be altogether discarded; the improvements in productivity of the TCA firms manufacturing electrical machinery, for example, suggest that this relationship can be a fruitful one when the right conditions are found. The need to accelerate development being paramount, none of the means of doing so can be dismissed. But the deficiencies of the mechanisms serve to underscore the importance of a realistic attitude on the part of the less developed countries toward foreign enterprise participation, and the need for intensified domestic efforts directed at improving their ability to absorb imported technologies.

[ Condensed from International Transfer of Technology to India. New York: Praeger Publishers, 1973, pp. 3-5, 26-43, Chs. 5 and 6 summarized, pp. 129-137.
Copyright © 1973 by Praeger Publishers. Reprinted with permission. ]

# INDEX–VOLUME XI, 1973

Subject


Africa
1:22-29, 40-48, 57-70
3:43-58, 96-106; 4:55-61
Agriculture
Pest Control
1:93-124
Project Appraisal for
3:3-27
Rural Public Works
4:41-80
Asia
1:75-80; 2:93-106
4:27-33, 62-80, 98-124

Banks, Multinational
3:67-106
Botswana
1:57-63

China, People's Republic of
4:98-108
Colombia
4:19-26

Development Measures
2:109-124

Education, Non-Formal
1:57-72
Employment (See also Rural Works)
Reducing Unemployment in Ceylon
1:75-80
Public Investment for
1:81-90

Finance
Monetary Reform
2:41-74
Multinational Banks
3:67-106
Taxation
4:3-40

India
2:93-106; 4:27-33, 62-80, 109-124

Industry
Technology Transfer
4:83-124

Kenya
1:64-70; 2:54-58

Latin America
1:7-21, 30-39, 98-105
4:19-26, 92-97

Mexico
4:92-97
Monetary Reform
Exchange Rate Flexibility
2:71-74
Need for
2:41-47
Proposals for
2:61-70
Special Drawing Rights
2:48-60
Morocco
4:55-61
Multinational Banks
African Development Bank
3:95-106
Regional Development Banks
3:90-94
World Bank
3:67-89

Non-Formal Education
Annotated Bibliography
1:71-72
Brigades in Botswana
1:57-63
General
1:51-56
Youth Centers in Kenya
1:64-70

Non-Tariff Trade Barriers
Effect on Developing Economies
3:118-124
Reducing Barriers
3:109-117
Nutritional Planning
Commercial Aspects
2:87-92
In India
2:93-106
Protein Supplies
2:77-86

Pest Control
1:93-124
Project Appraisal
Agricultural Projects
3:3-27
Estimates-Outcomes Comparison
3:36-40
Little-Mirrlees Method
3:28-35

Regional Integration
Africa
1:47-48
Central Africa
1:40-46
Central America
1:7-21
Latin America
1:30-39
Trade Shifts
1:3-6
West Africa
1:22-29
Rural Works
General
4:41-54
India
4:62-66
Land Army Project
4:67-80
Promoticn Nationale in
Morocco
4:55-61

Sea, Law of the
Access to Resources
2:3-11, 31-39
Ocean Politics
2:19-24
Subsea Oil and Gas
2:12-13
UN Conference on
2:25-30
Undersea Mining
2:14-18
Sri Lanka (Ceylon)
1:75-80

Taxation
Agricultural
4:27-33
Economic Development
4:11-18
Evasion
4:19-26
Tax Structures
4:3-10
Trends
4:34-38
Technology Transfer
Choice of
4:98-108
India
4:109-124
Legislation in Mexico
4:92-97
Trends
4:83-91
Trade Policy
Non-Tariff Barriers
3:109-124
Regional Integration
1:3-48

Water Resources
In East Africa
3:43-53
Reuse of
3:59-64
Rural Investment in
3:54-58

## Author


Abbott, John C.
2:77-86
Adedeji, Adebayo
1:22-29
Apple, J. Lawrence and
Ray F. Smith
1:98-105
Asher, Robert E. and
Edward S. Mason
3:67-89

Balasubramanyam, V. N.
4:109-124
Baldwin, George B.
3:28-35
Baldwin, Robert E.
3:109-117
Berg, Alan
2:93-106
Bhatt, V. V.
4:11-18
Bradley, David L., Gilbert F.
White and Anne U. White
3:43-53
Brown, Harrison, Charles S.
Dennison and Simon Teitel
4:83-91

Carruthers, I. D.
3:54-58
Childs, Patrick
2:31-38
Colombian Commission on Tax
Reform, Richard A. Musgrave,
President
4:19-26

Davis, David E.
1:120-124
Dennison, Charles S., Harrison
Brown and Simon Teitel
4:83-91
deVries, Tom
2:61-70
Diejomaoh, Victor P. and James
R. Sheffield
1:57-63
Donovan, W. Graeme
4:67-80

Editor
2:120-124
Elkan, Walter
1:64-70

Friedheim, Robert L.
2:25-30

Gittinger, J. Price
3:3-27

Howe, James W.
2:48-55

International Monetary
Fund, Executive
Directors of
2:41-47
Ishikawa, Shigeru
4:98-108

Jackson, Dudley and
H. A. Turner
4:55-61
Johl, S. S.
4:27-33

Leipziger, Danny M.
2:56-60, 71-74
Lewis, John P.
4:41-54
Luard, Evan
2:3-11

Maechling, Jr., Charles
2:19-24
Mansfield, Charles
4:3-10
Mason, Edward S. and
Robert E. Asher
3:67-89
McClelland, Donald H.
1:7-21

McKelvey, V. E. and Frank F. H. Wang
2:12-13
McNew, George L.
1:93-97
Meerman, Jacob
4:34-38
Mero, John L.
2:14-18
Musgrave, Richard A., President, Colombian Commission on Tax Reform
4:19-26
Mutharika, B. W. T.
1:47-48
Mytelka, Lynn Krieger
1:40-46

Okun, Daniel A.
3:59-64
Otten, Adrianus G. H. and Shlomo Reutlinger
3:36-40

Paulston, Rolland G.
1:71-72

Reutlinger, Shlomo and Adrianus G. H. Otten
3:36-40

Seers, Dudley
1:75-80; 2:109-119
Sheffield, James R. and Victor P. Diejomaoh
1:57-63
Singh, Manmohan
3:90-94
Sloan, John W.
1:30-39
Smith, Ray F. and J. Lawrence Apple
1:98-105
Subcommittee on Insect Pests, Agricultural Board of the U. S. National Academy of Sciences
1:106-119

Teitel, Simon, Harrison Brown and Charles S. Dennison
4:83-91
Turner, H. A. and Dudley Jackson
4:55-61

U. S. Agency for International Development (AID)
1:51-56

Vyas, V. S.
4:62-66

Walter, Ingo
3:118-124
Wang, Frank F. H. and V. E. McKelvey
2:12-13
Wang, N. T.
1:81-90
White, Anne U., David Bradley and Gilbert F. White
3:43-53
White, Gilbert F., David Bradley and Anne U. White
3:43-53
White, John
3:95-106
Wickström, Bo
2:87-92
Wionczek, Miguel S.
4:92-97

Book Reviews
Mutharika, B. W. T.
1:47-48
Bibliography on Non-Formal Education
1:71-72

☆U.S. GOVERNMENT PRINTING OFFICE: 1973-544-367/1

4773-77-3
DT